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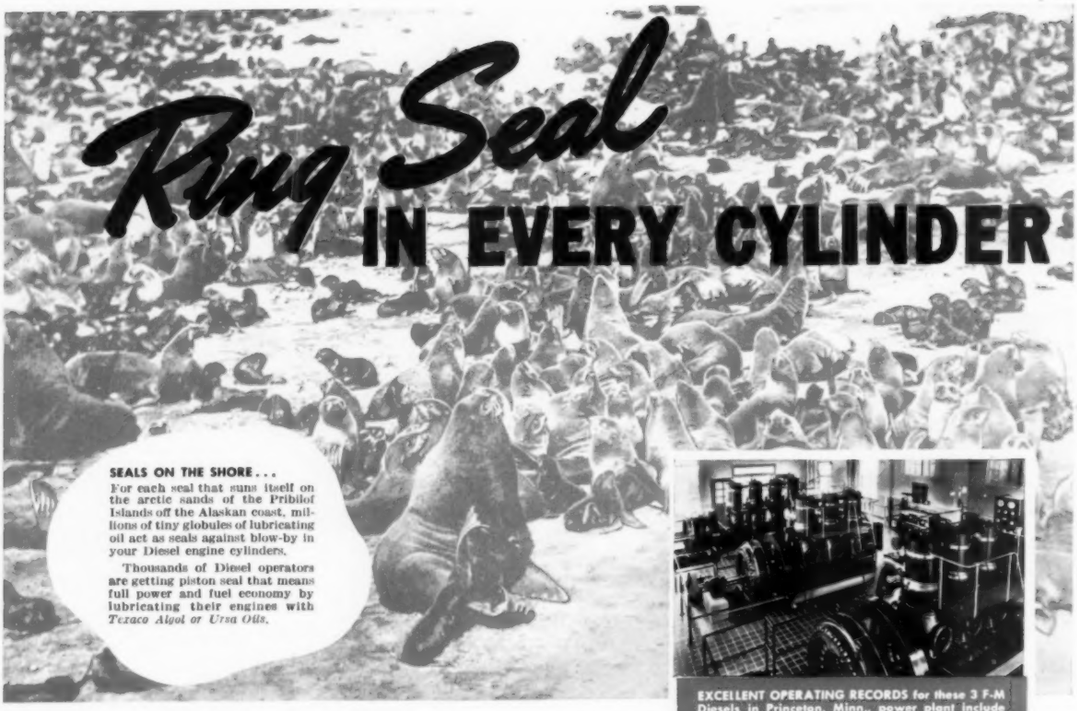
DIESEL PROGRESS

MAY, 1941

Ring Seal IN EVERY CYLINDER



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For each seal that suns itself on the arctic sands of the Pribilof Islands off the Alaskan coast, millions of tiny globules of lubricating oil act as seals against blow-by in your Diesel engine cylinders.

Thousands of Diesel operators are getting piston seal that means full power and fuel economy by lubricating their engines with *Texaco Algol or Ursa Oils.*

EXCELLENT OPERATING RECORDS for these 3 F-M Diesels in Princeton, Minn., power plant include average cylinder wear for the first year of only .0013 in., with a maximum, at top of ring travel, of only .005 in.; not a sign of ring sticking. Since installation, they have been lubricated exclusively with *Texaco Algol Oil.*

SEALING on the Pribilof Islands off the Alaskan coast is a highly seasonal business.

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TEXACO REG. T.M.

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FOR ALL DIESEL ENGINES

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DIESEL and GAS ENGINE PROGRESS

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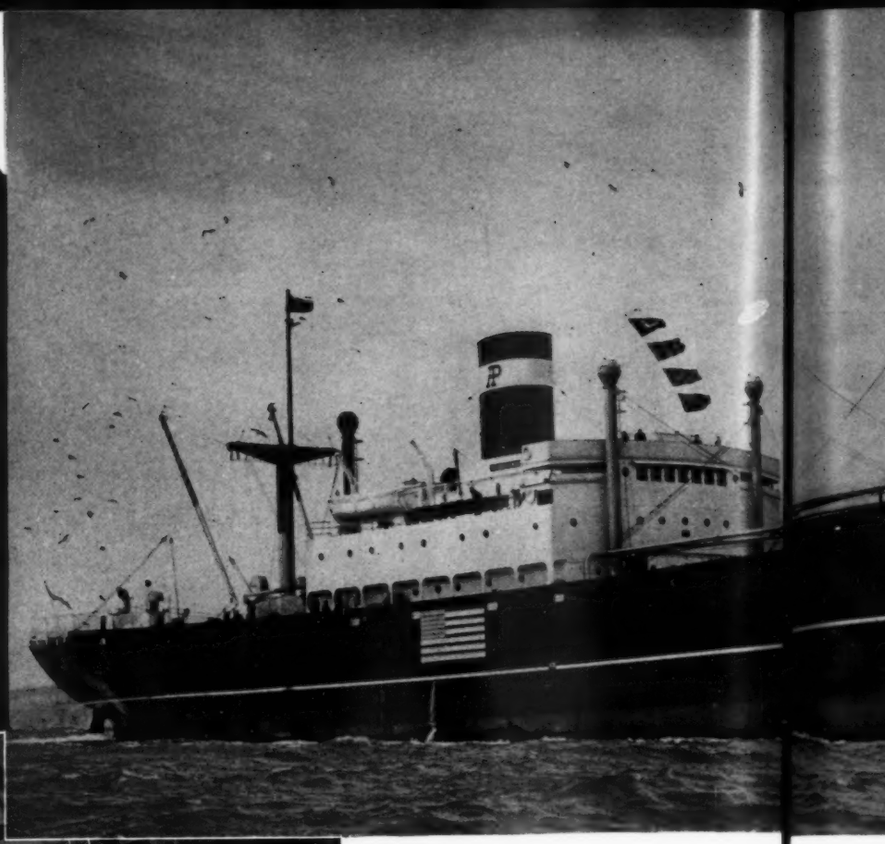
REX W. WADMAN
Editor and Publisher

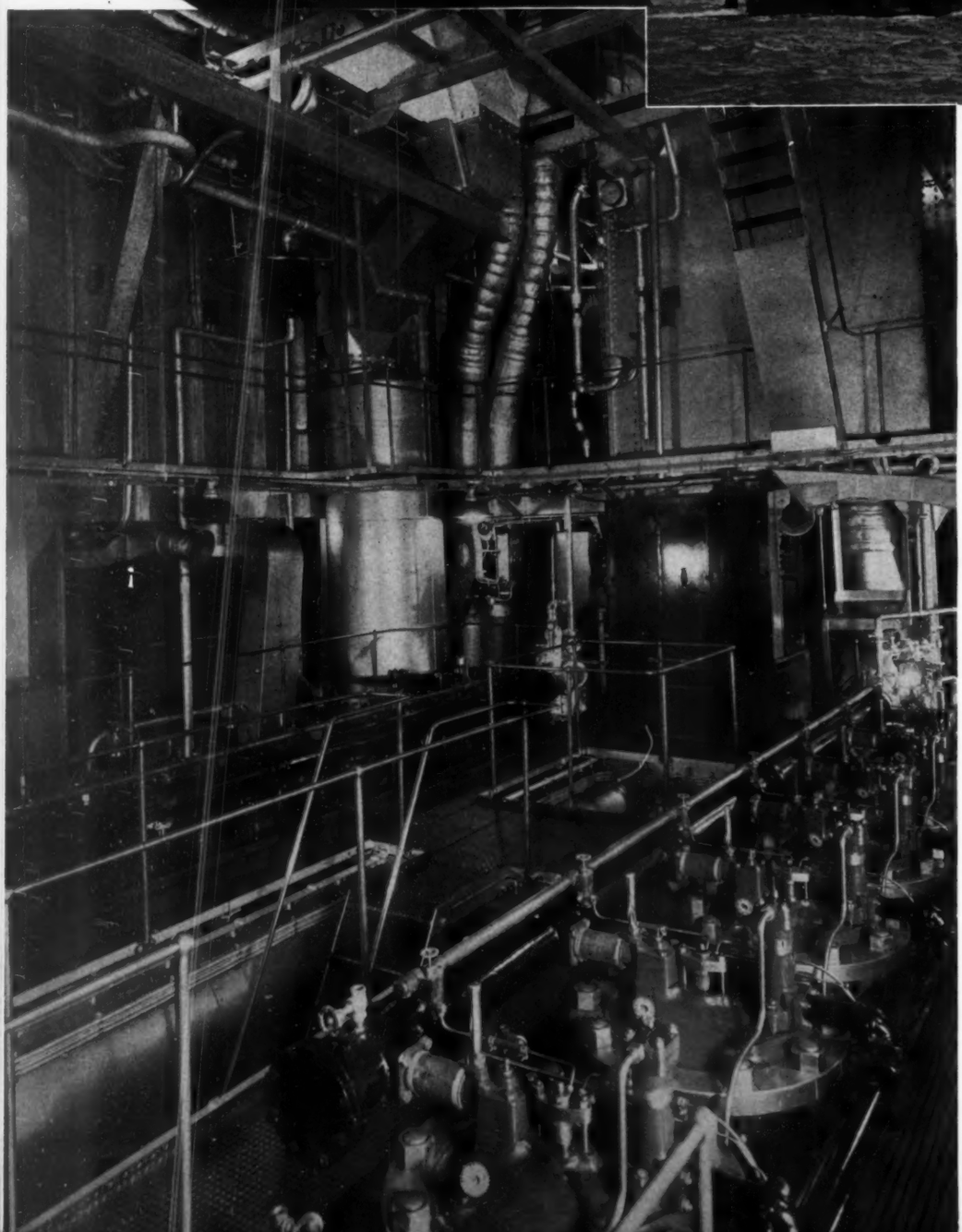
FRONT COVER ILLUSTRATION: The Allis Imperial Diesel tug "Leo" just launched at the Gulfport Boiler and Welding Works, Port Arthur, Texas. Has 400 hp. standard Diesel tug built by Bruno Schmitz for the Rancho-Arthur Corp. of Houston, Texas, and completed late with paid advertising money for her owners in exactly 30 days after the keel was laid. [illegible]

TABLE OF CONTENTS ILLUSTRATION: Customer's answer to the question, "Do you have National Defense orders?" Four views are twelve Diesel tractors used to haul heavy gasoline equipment at Fort Kamehameha, Hawaii.

DIESEL PROGRESS for May, 1940, Vol. VI, No. 5. Published monthly by Diesel Engine Inc., 2 West 45th Street, New York, N. Y. [illegible] Subscription rates: U. S. A. and Possessions $3.00 per year; 30c per copy. All other countries, $4.00 per year; 40c per copy.

SIDNEY H. CAMPBELL
Vice President





By REX W. WADMAN

SAN Francisco, Calif.—The first ship to come out of a new shipyard is always news and this is the story of the Diesel Ship "American Manufacturer," launched at 12:30 in the afternoon of Thursday, August 8, 1940. It isn't exactly true to state that the South San Francisco Shipyard of the Western Pipe & Steel Company of California is a new yard but, as a shipbuilding plant, it has been inactive for so many years that, in effect, it today is a new yard. An excellent job of organizing and erecting the necessary plant in which to build the five Type C-1-B vessels for the U. S. Maritime Commission has been done and the "American Manufacturer," the first of the five vessels to be completed, is a thoroughly workmanlike job. On the Great Lakes and down on the Gulf Coast we are accustomed to side launchings, but it is a bit unusual to find that type of launching practiced here on the West Coast. The "American Manufacturer", however, was side launched, as have been all of the vessels that the Western Pipe & Steel Company is building for the Maritime Commission. In keeping with the publicity-minded characteristics of the delightful people who live out here on the Pacific Coast, the "American Manufacturer" was christened with Californian champagne by a San Francisco lady, Mrs. Kenneth D. Dawson, wife

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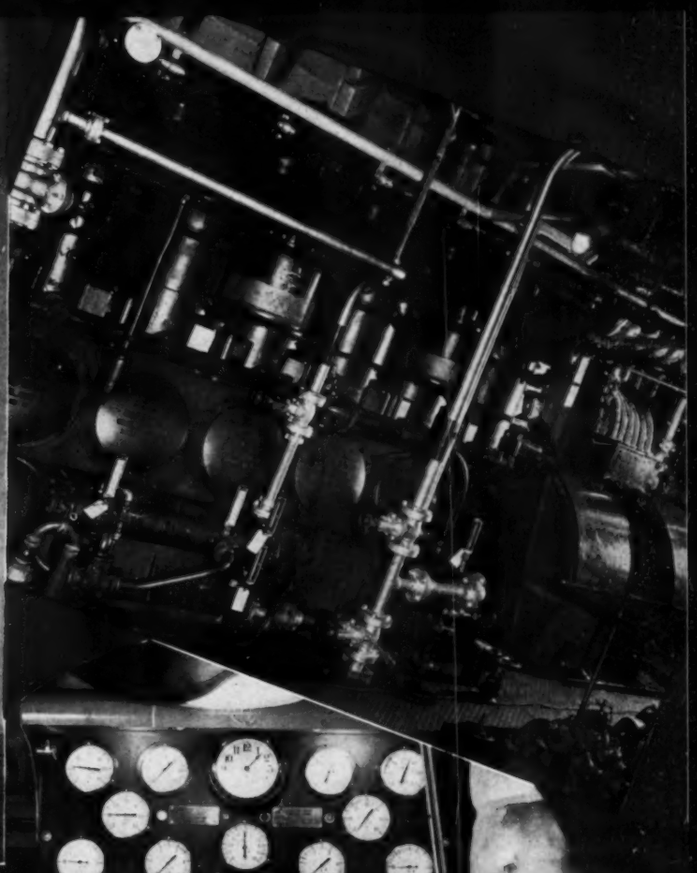


of the Vice President of the United States Lines under whose flag this capable Diesel ship will sail. I went over this vessel from stem to stern and I watched the building operations on two of the other ships following closely behind her and somehow or other these people out in South San Francisco have gathered together a bunch of workmen who know their business and who have created a fine ship.

In brief, the "American Manufacturer" is 417 ft. 9 in. overall, has a molded breadth of 60 ft., a deep load draft of 27 ft. 6 in., her depth to main deck is 37 ft. 6 in. As many of our readers know, she is a three deck job, has a shaft horsepower of 4,000 hp. and the ship's complement consists of 59 officers and crew. Excellent accommodations are provided for eight passengers. The fuel oil capacity is 760 tons which gives the "American Manufacturer" a normal cruising radius of 12,000 nautical miles and a maximum cruising radius of 20,800 nautical miles. The fresh water capacity of the ship is 300 tons. Touching on her freight capacity, her gross tonnage is 6,750 and her total deadweight tonnage is 8,975. Total displacement tonnage to deep load line is 12,875. Her launching weight was a bare 3,300 tons. The gadgets that have since been added make up the difference. Her rate of speed is fourteen knots fully loaded but I can tell you, off the record, that she can do better than sixteen knots when she wants to.

An unusual feature of the way they build ships out here in San Francisco is that all the main machinery, auxiliary machinery, reduction gear, tail shaft, propeller, rudder and rudder stock are all in place before she was launched on August 8 of last year.

The main engines in the "American Manufacturer" come from the Busch-Sulzer shops in St. Louis and deliver a total shaft horsepower of 4,000 through Farrel reduction gears and Westinghouse electric couplings to a single shaft operating at 79 rpm. The auxiliary engine layout on the "American Manufacturer" has been very well worked out and consists of a pair of Atlas Imperial Diesel engines rated at 350 rpm. Both engines are mounted on Korfund Vibro-Isolators which materially add to the comfort not only of the crew but of the passengers. These auxiliary engines are operating on the same heavy fuel as the main engines, so that only one grade of fuel is carried aboard ship.

Insofar as accessories are concerned, it might be mentioned that the two Atlas generating sets are equipped with Woodward governors, Alnor pyrometers, and Burgess intake silencers. The main Busch-Sulzer engines have Nathan lubricators, Erie crankshafts, Roots-Connersville blowers, Weston tachometers, Alnor pyrometers, and Wright hoists. Maxim silencers are used on the main and auxiliary exhausts.

THE SEROTA ICE COMPANY

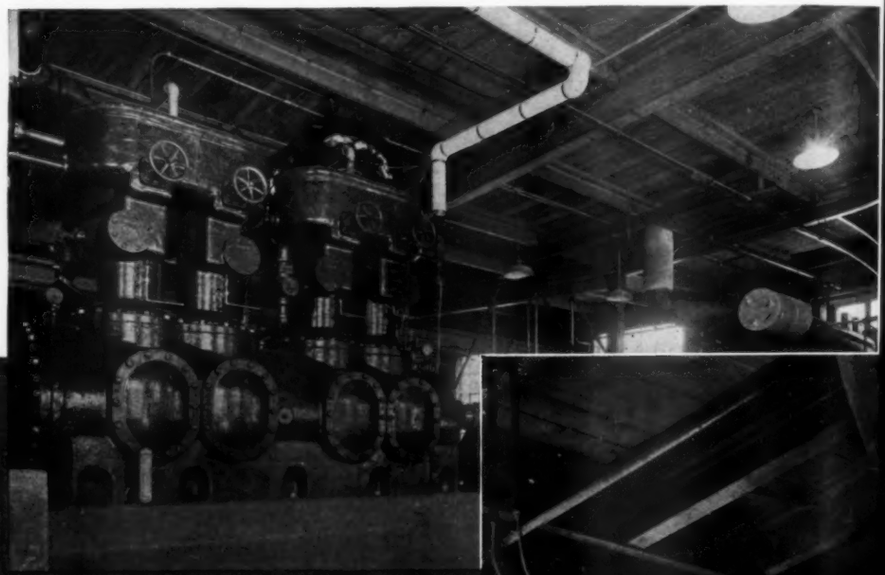
By GEORGE D. CROSSLEY

BY the time this issue of DIESEL PROGRESS is off the press, one of New York's most recent stationary Diesel installations will be in commercial operation. It is located at the Serota Ice Company, Brooklyn, New York, and represents a major step in modernization of this plant which has served the public faithfully for the past quarter of a century. In addition to retailing coal, Mr. David Serota has manufactured ice since 1927. His plant is fitted with the Arctic-Pownell system of freezing and, until this winter, has used purchased electric power for driving compressors and for other general services. The cost of ice on this basis has averaged 45 cents per ton for power alone, and it is estimated that the new Diesel-generator-compressor plant will reduce this cost by more than fifty per cent. Naturally, no record of operating figures is available at this writing since the plant has not been in commercial operation but current performance of comparable installations provides an accurate basis for predicting a substantial power cost reduction.

In place of three motor-driven horizontal ammonia compressors there are now two vertical units for normal operation. The first and largest is a Frick 275 ton machine directly connected to an Alco [illegible] through a [illegible] Farr[illegible] coupling. The engine is rated [illegible] hp. at 600 rpm, while [illegible] a compressor speed of 300 rpm. [illegible] Directly connected to the engine [illegible] and running at engine speed is the Ideal Electric alternator, supplying power to the second and smaller motor-driven 40 ton Frick compressor. All other electric requirements of the plant are also taken care of by this generating unit. The generator is an exceedingly compact unit, termed "Ideal Power Unit" or packaged unit. The belt driven exciter for the alternator is mounted on top of the alternator and the control is mounted in a metal container on the side of the frame near the top, so as to form one complete unit.

At the present time utility standby is maintained for peak production, when the third of the original three motor-driven horizontal compressors could be pressed into service. Since the demand charge for this amounts to $4500.00 per year, however, it is planned to eliminate the standby connection and provide for peak requirements from the 20,000 cake storage.

The freezing floor of the plant contains 3240 300 pound cans. Previous capacity was 300 tons per twenty-four hour day and is now 325 tons with both Diesel and purchased power in service. At the present time, however, this total capacity is seldom needed and the two Diesel-driven compressors will supply 210 tons which,

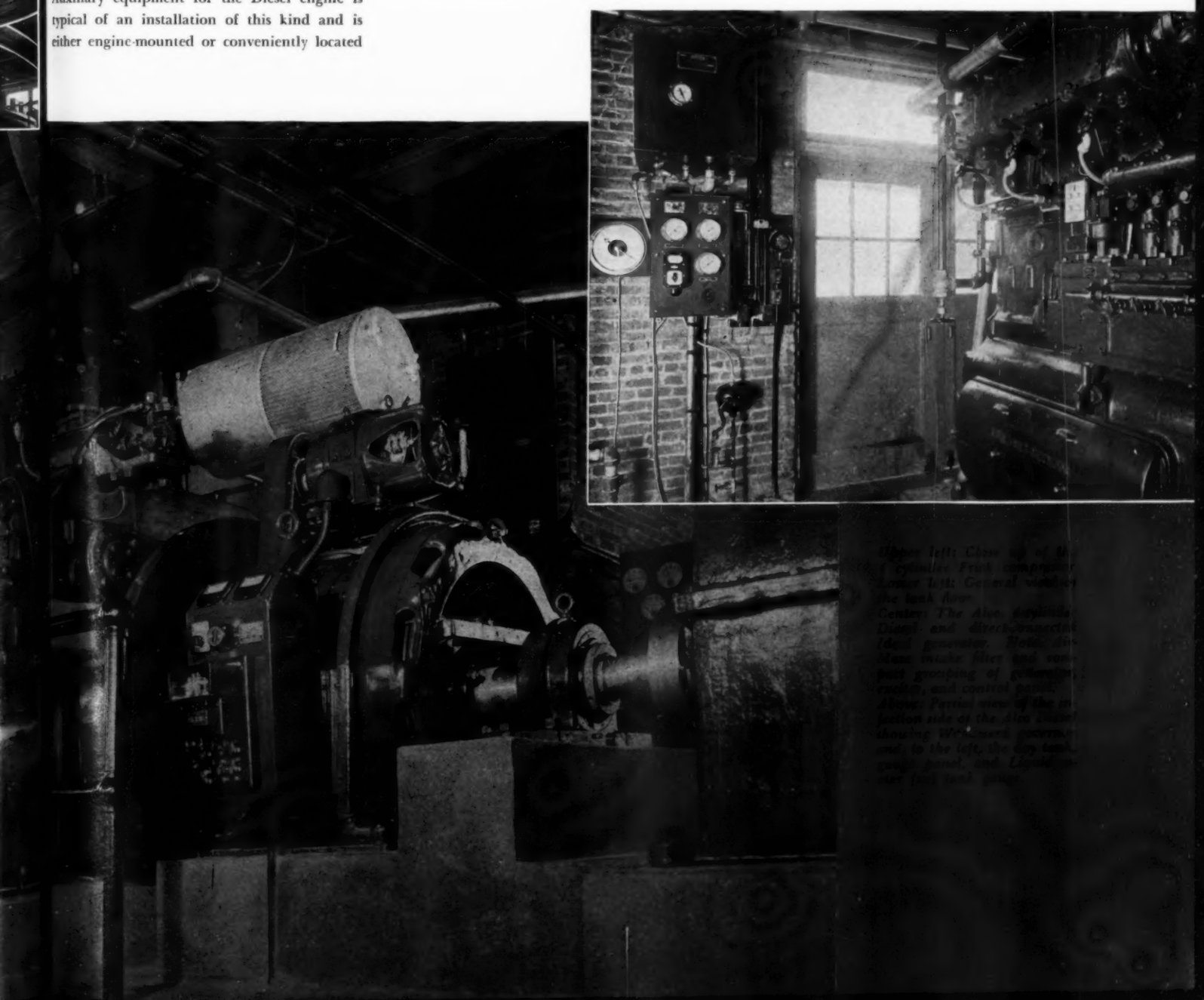


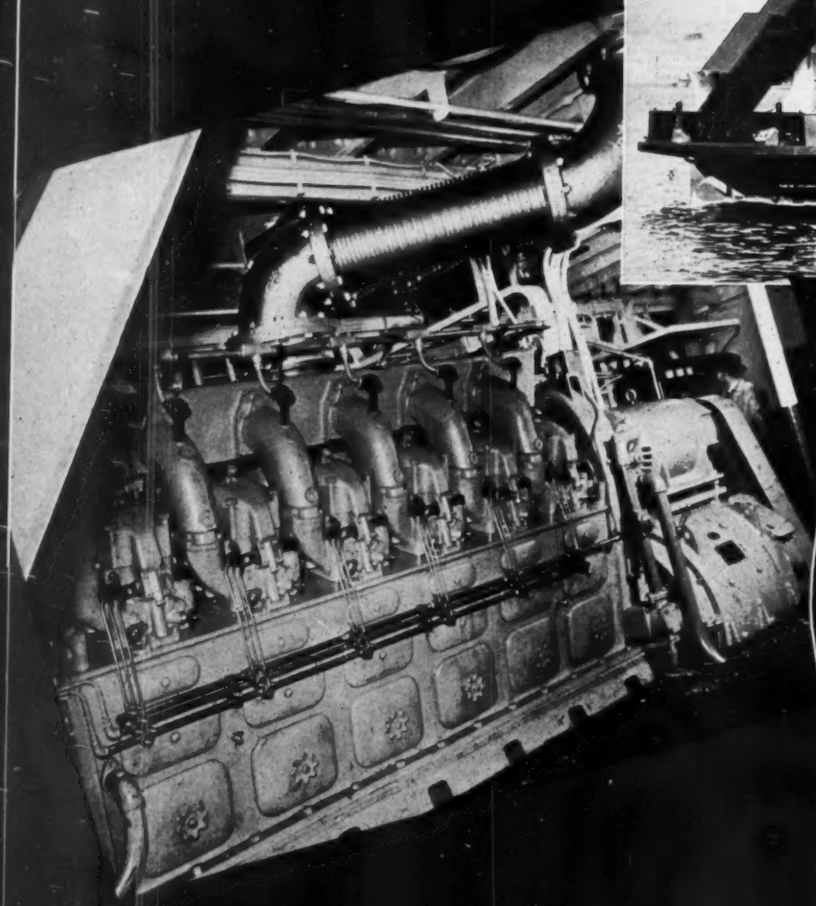
with the large storage reserve, are sufficient for normal demand. On this basis of operation, it may be predicted that the new Diesel should amortize itself in three to four years, after which the substantial savings effected will become new profits for the owner. His improved position to meet competitive prices is too obvious to require comment.

Mr. A. T. Bogart, Chief Engineer, has many years of manufacturing ice to his credit, and this plant was laid out and installed under his personal supervision. Typical of his alertness to new savings is the water-heating coil around the Diesel exhaust. In the Arctic-Pownell system of making ice, the cans are not drawn from the brine. Hollow tubes are frozen into the cakes and ice only is withdrawn. Naturally, hot water must be introduced to free the tubes, and this is now supplied in ample quantity from the ingenious waste heat recovery system.

Auxiliary equipment for the Diesel engine is typical of an installation of this kind and is either engine-mounted or conveniently located nearby. The engine carries a Woodward governor for accurate speed control needed by the generator, attached fuel oil transfer and booster pumps, Burgess exhaust Snubber, Air-Maze intake filter and silencer, and Detroit safety controls on both lubricating oil pressure, cooling water temperature, and excessive ammonia pressure. These last comprise both a warning signal and automatic cutout if the warning is disregarded. A Thomas D.M. flexible coupling connects the compressor to the reduction gear. The 12,000 gallon fuel tank is fitted with a Liquidometer gauge which gives a constant reading of fuel on hand in gallons. Lubricating oil is continuously circulated through a Crane Refiner to maintain its original purity for many extra hours. Both fuel and lubricating oil are supplied by Socony-Vacuum.

Aside from marine service, ice manufacturing is perhaps the most exacting duty that can be given a Diesel engine. After this plant starts on or about April 15, it will be in almost constant operation night and day for approximately seven months, the only shut-downs permitted being for lubricating oil change and routine maintenance. Not only is the engine charged with the responsibility of making ice, it must also supply a steady flow of power for a twelve ton compressor which holds the main storage room at 20 degrees. Were this unit to be shut down for any length of time, all the ice in storage would fuse into one big block. Thus is demonstrated the dependability of modern Diesels, as well as their proven economy. Nor is Mr. Serota taking this type of power on faith, since he already has several Diesel units in operation at other plants and knows in advance what he may expect from his new engine. His recent action in converting the Utica Avenue plant is the result of previous personal experience which assures him proven savings as well as complete control of his power source.





Shipyards, Oyster Bay, L. I. This big boat, large enough to carry fifty automobiles, joins two new sister ships now in service on the same run. The fourth of the class is now nearing completion in a Boston, Mass., shipyard.

Speed trials were made over a half mile course and an average was taken of windward and lee-

engineer to care for any part of his machinery with ease. According to ferry line officials, the ship should make the 69th Street run in approximately ten minutes.

Traffic on this run increased 62% in 1940 over 1939, the ferries then in service having carried a total of 534,909 cars. The "Gotham" joins

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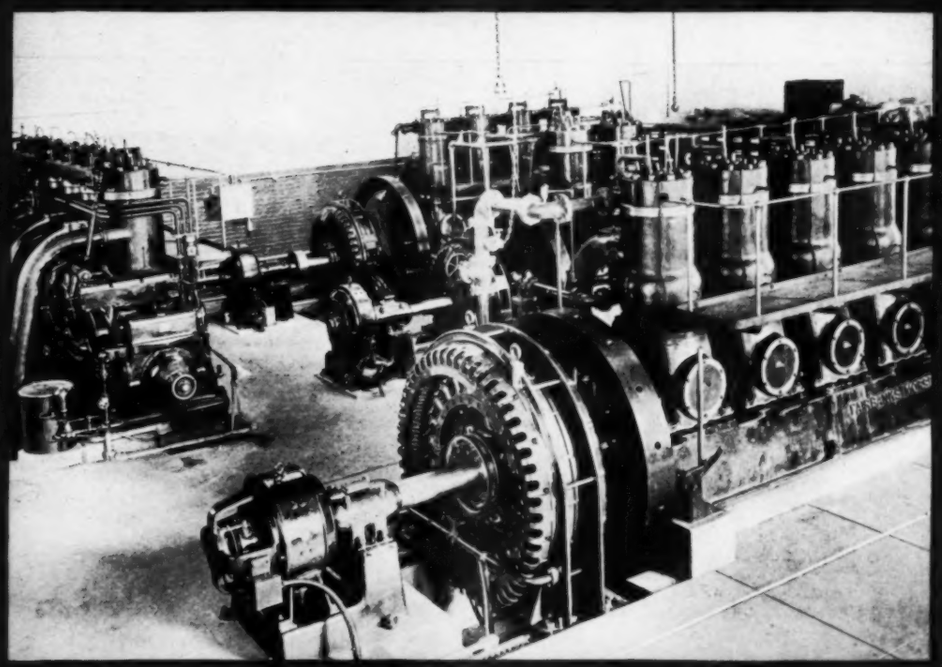
nd auxiliary generators,
otor all by General Motors;
nor and overspeed stop on main
by Woodward; tachometer by Jones
Motrola; fuel oil filters by Purolator and
Elliott; lube oil clarifier by Briggs; lube oil
cooler and jacket water heat exchanger by
Schutte-Koerting; starting air compressor by
Ingersoll-Rand; intake air Snubber by Burgess;
Vortex exhaust spark arrester-silencer by Engi-
neering Specialties; Ironclad storage battery by
Exide; sea water strainer by Elliott; switch-
board instruments by Allis-Chalmers; water line
valves by Fairbanks.



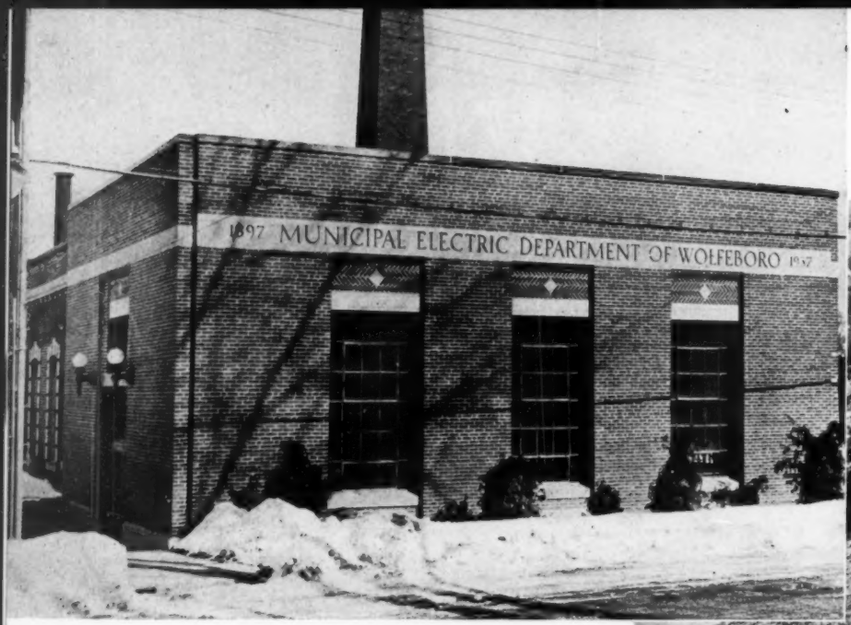
WOLFEBORO, NEW HAMPSHIRE

By ART MICHEL

WOLFEBORO is the kind of town: Where 350 street lights cost less than 1c per kwh. (The rest of New Hampshire pays a 4 to 5c average.); Where 2500 citizens use electricity in their homes for less than $5 per 100 kwh. (In 1930 that rate was $13.); Where during the past 15 years the Municipal Electric Light Department has all but retired a $95,000 investment and added $75,000 to capital investment; supported the town's industry with free light and power during the troublesome 1930's; doubled the number of Diesels in its plant; reduced rates year after year and to top all this is returning to the town more than $5,000 annually in FREE current: Where a three-man Commission, (in office without change for 20 years) had the courage to originate and expand new methods and facilities and, by an aggressive policy made to match the times, brought Wolfeboro through depressions, hurricanes and sudden spurts of growth—without undue strain, loss, or excitement.

The history of Wolfeboro's Electric Light Department is older and more interesting than most. Anyone testing the case of municipal ownership would do well to observe the progression of events at Wolfeboro which incidentally might have taken place in any like town in America.

In the Lakes region of New Hampshire, where the White Mountains and 450 lakes and streams form a Switzerland scene of their own, Wolfeboro is the hub of an intense summertime activity. The town's population, June to September, zooms from 2500 to 6500 and besides its steady summer residents, it counts transient visitors by the tens of thousands every season. It is the business center, too, for many lumber and crafts industries that lie through the densely wooded country north and east of it. The community is proud of its several manufacturing plants employing many of its own citizens. But it is not an industrial town in the manner of other New Hampshire cities



Exterior view of Wolfeboro's modern Diesel generating plant.

to the south. Wolfeboro's photo from the air shows that nothing is permitted to mar the "vacation atmosphere" which has always been Wolfeboro's first attraction.

For Wolfeboro's fame in the East stems from its historical distinction as America's first summer resort, and from its present-day facilities for vacationists. Its location makes this fame almost inevitable, as Wolfeboro is the big "harbor" for huge Lake Winnipesaukee, while the White Mountains rise from the very edges of its corporate limits.

The Municipal Electric Light Department long ago pledged itself to the job of making Wolfeboro ever more attractive to visitors, the [illegible] of industry that Wolfeboro could [illegible] and the townsfolk [illegible] it to [illegible] ting rates it lowered vacation-costs directly and indirectly, and it has been able to extend its lines for forty miles from the center of town, bringing its poles right to the doors of secluded cottages and camps. In the worst days of 1932, when the town was threatened with the loss of its largest shoe factory through competition elsewhere, the Electric Light Commission said, "Bring the [illegible] factory to Wolfeboro and [illegible] here. We'll give you free [illegible] power." And that was done, and 75 Wolfeboro families were thus kept off relief.

Time and again Judge Britton, Harold Hart and Victor Hodge (the third member of the town's 20 year Electric Commission who died in office in 1939) summoned the town's Diesel plant to meet emergencies and developments, successfully disposing of each in turn.

Wolfeboro's electric Light [illegible] has a history of continued [illegible]ent. This history need [illegible]:

1893—Terrific town argument: Shall Wolfeboro be provided with electricity?

1897—Oil-lamp advocates are routed. Wolfeboro installs a 60 kw. generator steam-driven in the back room of a sawmill.

1912—New boilers necessitate a new plant building.

1915—Two more steam-generators added—240 kw. and 72 kw.

1919—Commissioners Judge William Britton, Harold Hart and Victor Hodge, elected to office.

1927—One 120 hp. and one 240 hp. Fairbanks-Morse Diesels installed.

1928—One 360 hp. F-M Diesel installed.

1932—Depression. Plant offers free light and power to hard pressed town industry.

1935—240 hp. Diesel installed in 1927 completely modernized for greater efficiency.

1937—Plant enlarged and new 450 hp. Fairbanks-Morse Diesel added.

1938—Hurricane. Wolfeboro restores essential service in 6 hours; faster than any other semi-rural agency's record.

1941—Annual report for 1940 shows $7,605 net income for year, but $13,000 remaining of original $100,000 debt and $12,000 in savings bank. Rate again to be lowered.

Aerial view of Wolfeboro, N. H., which nestles at the foot of the White Mountains, on Lake Winnipesaukee, and enjoys the distinction of being America's first summer resort.

But 3,000 square feet of floor space is required to accommodate all the equipment in Wolfeboro's municipal power house. To the 50′ x 30′ building of 1912 was added in 1937 a building of equal size and the older structure, now at the rear, houses merely pumps and auxiliary equipment of the four Diesels.

Nineteen hundred and twelve was also the year in which Fairbanks-Morse developed its first heavy duty two cycle oil engine, the various successors of which later played such an important role in Wolfeboro's growth. Note this builder's latest addition—the 450 hp. Model 32-E in the foreground of the photograph on page number 27. Each of the other three engines might be considered from a design standpoint as a forerunner of this last installation. This is emphasized by the fact that Wolfeboro was able to completely modernize its 280 hp. engine installed in 1927, with up-to-date interchangeable parts. Results of this unique conversion were summarized in Wolfeboro's Annual Report for 1937 as follows: "Last year this converted engine generated 110,000 *more* kilowatt hours using 350 *less* gallons of fuel oil than in the previous year."

Indirect cooling is employed throughout, using Sims heat-exchangers. The plant's pumping equipment for cooling water, located in a concrete pit in the rear portion of the plant, consists of 6 Fairbanks-Morse pump-and-motor combinations. Heat from the cooling system keeps the entire building at about 70 degrees during the coldest weather.

The perfection of detail, and the provisions the Commissioners have made for all eventualities in the running of the plant (such as cross-over connections between the raw and soft water supplies for emergency service) are reflected in the consistency of low upkeep costs shown in the town's annual reports.

In 1937, the first year that Wolfeboro used all four of its present Diesels, the average cost per kwh. was 1c. Before Diesels were installed at all in 1927, the cost per kwh. was 2½c. In the first ten years of Diesel operation costs were comparably low as the fourth Diesel was entirely paid for from earnings of the other three.

In 1938 the cost per kwh. dropped to 9 mills, and in 1939, a new low was reached when the cost dropped to 8 1/6 mills. For 1940, this cost, which includes fuel oil, lube oil and engineer's wages, is close to a flat 8 mills.

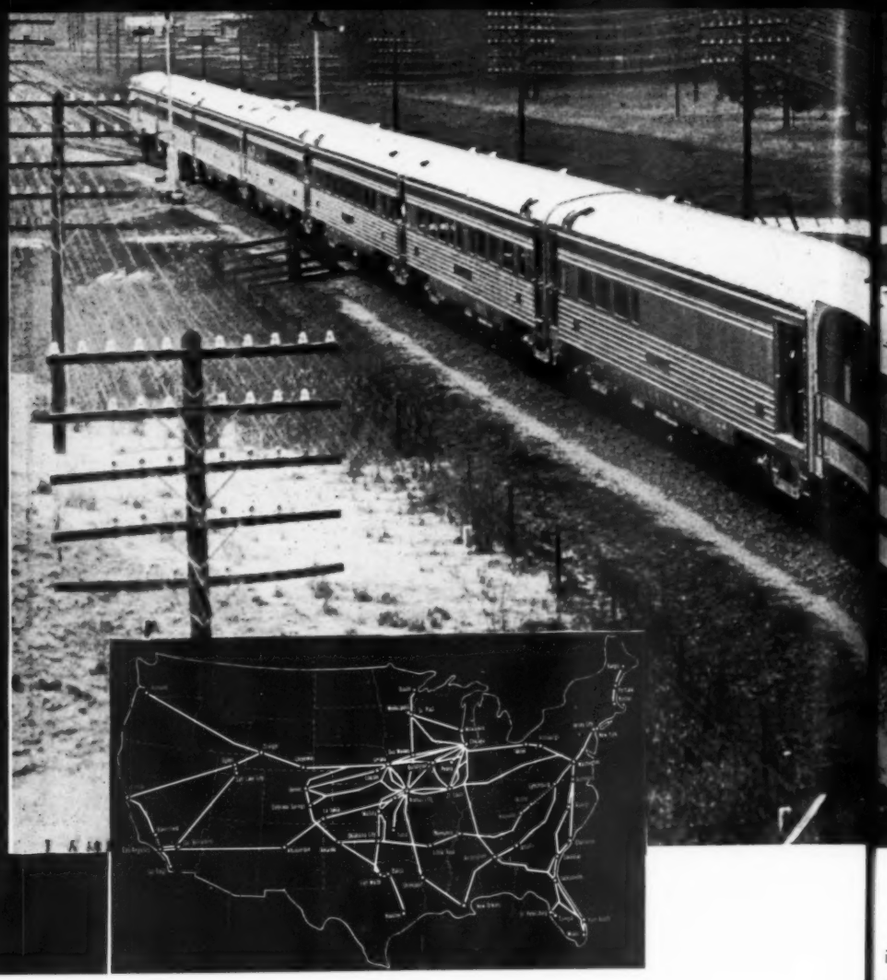
In 1939, year round consumers paid an average of 4½c per kwh. for total consumption, while summer residents paid only about 5c per kwh. (And in 1922, before the Diesel came to Wolfeboro, 20c per kwh. was considered a fair [illegible])

Besides this, [illegible] furnished to various town [illegible] without cost, including town clock, fire department, skating rink, municipal celebrations and decorative lighting at Christmas and on July 4th.

Every year the lines of the Municipal Electric Light Department web the 81 square miles township more closely. Every year [illegible] go down while consumption [illegible]. Industry, as well as residence, is being attracted to Wolfeboro [illegible] greater plans for the town and its valuable asset are in the making. That these plans are justified is evident from the financial statement for 1940, released in March, 1941, at the Town Meeting:

Gross Revenue for the year 1940		$51,495.80
Operation and maintenance	$28,470.66	
Depreciation	11,259.72	
Uncollectable accounts	695.13	
		$11,070.29
Non-operating income	$767.61	
Less non-operating deduction	323.20	
		$11,514.70
Gross Net Income		
Interest on Outstanding Indebtedness	$1,296.25	
Given free current	2,613.15	
Total Non-operating Deductions	$3,909.40	
Final Net income transferred to Profit and Loss account		$7,605.30

In its annual reports Wolfeboro's Electric Light Commission has said, "We have never had any interruptions due to failure of the Diesels . . . (and) . . . we have increasing evidence of their reliability."



RAPID expansion of Diesel passenger train service in the United States since its inauguration only six and a half years ago is shown by the above map. The first Diesel passenger train began operating in the fall of 1934 between Kansas City, Omaha, and Lincoln, Nebr. With the advent of Diesel motive power on Southern Railway trains between New Orleans, Atlanta, and Washington, and between Memphis and Bristol, Tenn., a total of 141 of the nation's crack passenger trains are now being pulled by Diesel locomotives. The South has enjoyed the largest expansion of Diesel passenger power, mostly during the past three years, and now has fifty-six such trains or more than one-third of the country's total.

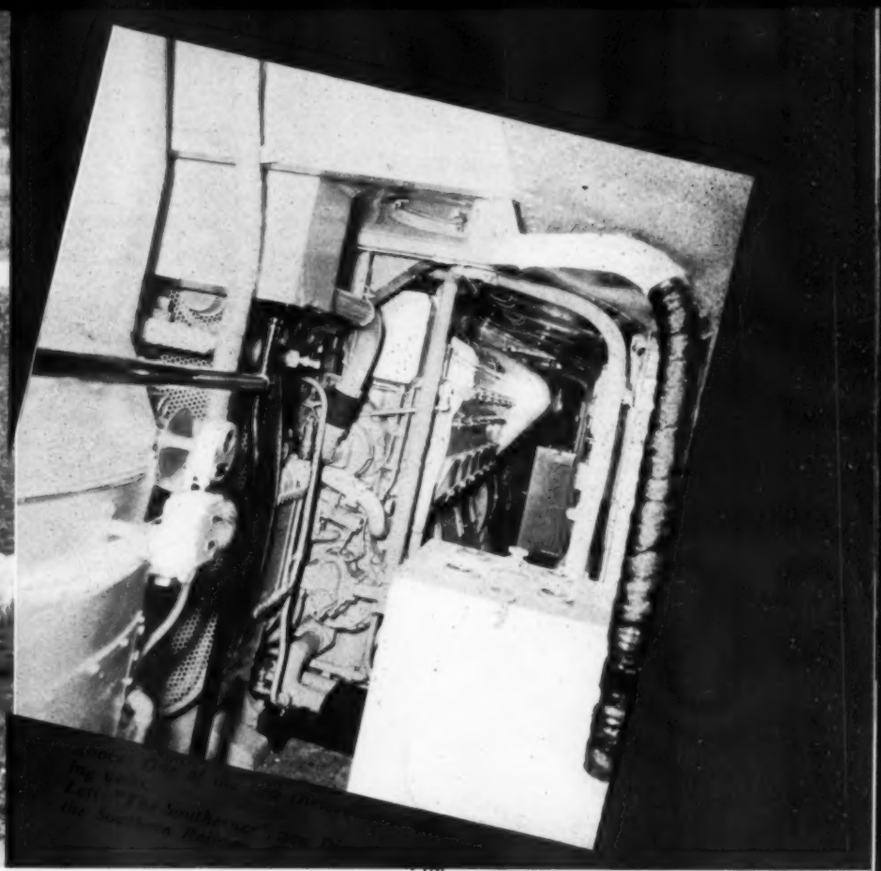
The most powerful type of single unit Diesel locomotives in the world will be used by the Southern Railway to pull "The Southerner," its new daily de luxe streamlined coach train soon to go into service between New Orleans and New York, on the long leg of the run between New Orleans and Washington, D. C., via Atlanta. Three locomotives, each of 2,000 hp., were completely built for "The Southerner" by the Electro-Motive Corporation, subsidiary of General Motors Corporation at La Grange, Illinois.

The Diesel locomotives which will power "The Southerner" are capable of a top speed of 117 miles per hour, and will make the 1160-mile run between New Orleans and Washington without change and without the necessity for excessively high top speeds. They embody all of the latest developments for fast schedule and luxurious transportation with the greatest safety and passenger comfort. Because Diesel locomotives accelerate and decelerate quickly and because they do not have to be stopped for servicing as often as steam locomotives, they are able to maintain a high average speed without the necessity for continuous top speeds, thereby adding greatly to passenger comfort. Their low center of gravity enables them to negotiate curves at somewhat higher speeds with safety and without discomfort of passengers. Power for each of "The Southerner" locomotives is provided by two 1,000 hp. General Motors two-cycle, V-type, twelve-cylinder Diesel engines.

These locomotives are equipped with electric transmissions consisting of 600-volt direct current generators coupled to the front end of each of the two Diesel engines from which the current is delivered by cables to four traction motors mounted down in the trucks, two in each truck. The traction motors are geared direct to the driving axles, the power finally reaching the rails at eight wheel points. This is responsible in part for the ability of these Diesel locomotives to start trains more smoothly and rapidly. It also accounts for the fact that these locomotives, with their smooth, quiet, steady flow of power, do not damage rails and road bed as rapidly as the pounding of reciprocating steam locomotives.

Because each locomotive has two Diesel engines, there is remote possibility of trains being stalled out on the right of way because of engine trouble. If one engine should develop trouble, the engineer generally can bring the train in with the power of the other engine. It is even possible to shut down one of the engines and make minor repairs on it while the train proceeds on the other engine. When the repair or adjustment has been made the engine can be started again and the train can continue under full power.

Although sleek, smooth and fast these locomotives in no way compromise the fundamental rule of the Southern Railway that safety is paramount. A number of features contribute to safety. A maximum of clear view of the track ahead, for instance, is given the engineer



in the control cab placed at a high vantage point at the front of the locomotive. Controls are as simple as those of an ordinary automobile, despite the greater power and weight at the command of the engineer. It actually requires less manual effort to start and stop the train than it does to start and stop an automobile. Other safety features include large and powerful automatic windshield wipers, automatic defrosters and sun visors, similar to those on today's automobiles, the emergency control pedal and the "Light from Mars" headlight.

Controls are so arranged that the engineer must keep his foot down on the emergency control pedal or the train automatically is brought to a quick stop. If he wants to rest his foot, the engineer can press his hand down on a control lever. Other essential controls, consisting of the throttle lever to control speed, a reverse lever and separate train and locomotive air brake levers are arranged with two thoughts in mind: first, to give the engineer the same controls he has been accustomed to in the operation of steam locomotives and, second, to place them so that they fall most naturally and with the least effort within reach of the engineer.

Abnormal conditions in the locomotive's power plant or trucks are flashed to the engineer by a unique system. In addition to the usual engine water temperature and oil pressure gauges, there is an illuminated annunciator box on the control panel of the cab and in each engine room of the locomotive. These annunciator boxes have illuminated red, green, and orange lenses. Each color has a different meaning to the operator. When one of them flashes he knows he has a "hot engine", or "low oil pressure," or a "heating boiler failure." When one of these lights flashes, an eight-inch gong also starts ringing and continues to ring until an attendant gives the abnormal condition his attention. "Wheel slip" is indicated by a white flashing light on the instrument board. A "hot journal" is indicated by a flashing light and ringing gong in the cab.

The powerful Mars headlight is one of the most important safety features on the locomotive. The 500,000 beam candle power "Light from Mars" is used as a warning signal to motorists and pedestrians at night. Located in the nose of the locomotive above the regular headlight, which still has the job of lighting the right of way for the engineer, the Mars light throws an intense lunar white beam in an oscillating orbit like a figure "8" turned on its side and laid across the track. The orbit of this light can rise to a height of 1,000 feet and spread to a width of 1,500 feet. It has been seen as far as twenty miles at night, and flashes of it as far as three miles in intense sunlight. The Mars light will also illuminate curves.

Faster average schedules of Diesel-powered trains have presented new problems in springing. These have been met in the new Southern locomotives by a new treatment of load suspension, giving them improved riding qualities and great stability in negotiating curves at high speeds. Four hydraulic shock absorbers, coupled with carefully designed springs on the locomotives, dampen side sway and also act to ease the body load against the truck frame as the locomotive is entering or leaving curves.

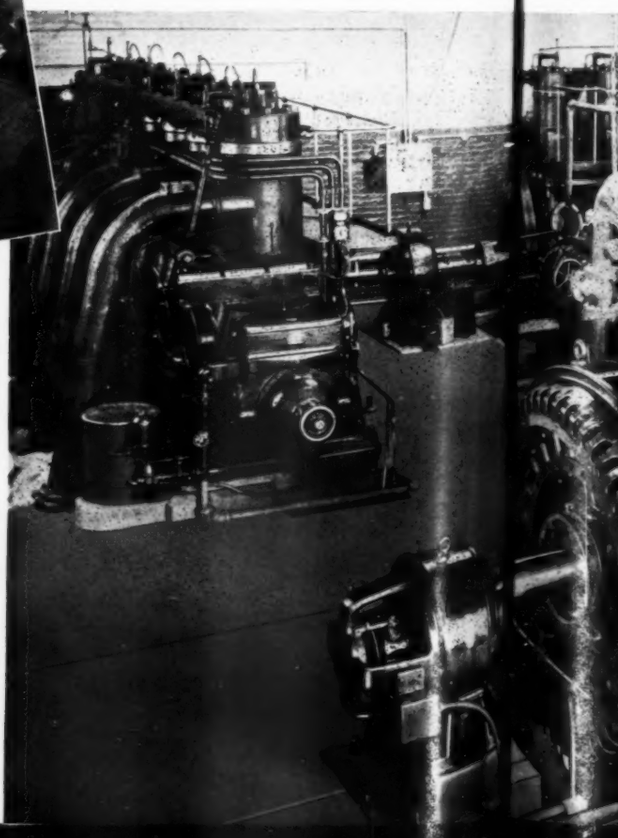
Special acoustical treatment insulates the cab against outside and inside noises, thereby adding to the comfort of the engineer and making it possible for him and his assistant to exchange signals and converse without appreciably raising their voices. An automatic oil burning boiler located in the rear of the engine room provides steam heat for both the locomotive and passenger cars. The boiler is regulated by an electric eye device which turns it up or down in accordance with the temperature in the cars. Ordinary fuel oil, such as is used in household oil burning furnaces, is used in the Diesel engines. Each locomotive unit carries 1,100 gallons of train heating boiler water and 1,200 gallons of fuel oil. Each locomotive unit weighs approximately 310,000 pounds, with a full supply of fuel, water and sand. Total length is 71 feet, height 13 feet 11 inches above rail, and width 9 feet 10 inches.

Does *Your* Town Have as Great a Success Story as Wolfeboro's?

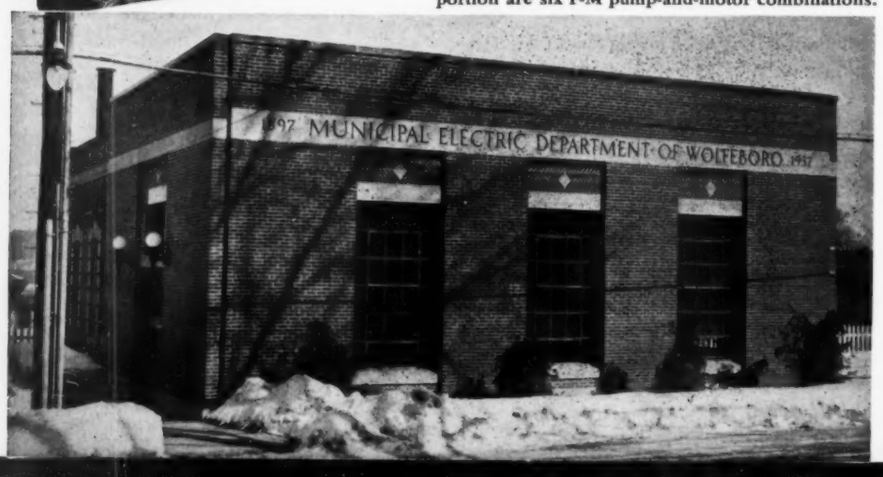
Aerial view of Wolfeboro, hub of vacation season activity in New Hampshire's lake region.

• • •

Wolfeboro's four F-M Diesels and Generators. The newest unit, a 450-h.p. Model 32, is in the foreground.



Wolfeboro's powerhouse. The new front section houses four F-M Diesels. In the rear portion are six F-M pump-and-motor combinations.



FAIRBANKS MORSE

DIESEL ENGINES ELECTRICAL MACHINERY RAILROAD EQUIPMENT WASHERS-IRONERS STOKER
PUMPS FAIRBANKS SCALES WATER SYSTEMS FARM EQUIPMENT AIR CONDITIONER

Here's Your Chance to Compare Notes:

PURCHASE RECORD

Wolfeboro, New Hampshire, installed its first two Fairbanks-Morse Diesels in 1927, its third in 1928, and its fourth in 1937. The first three engines not only paid for themselves from earnings, but built up a surplus to pay for the fourth.

GENERATING COST

Before 1927, Wolfeboro had a steam power cost of 2½c per kw.h. In 1937 generating cost was 1c per kw.h.; in 1938, 9 mills; 1939, 8⅛ mills; 1940, even less.

RATES

In 1939, year-round consumers paid 4½c per kw.h. In 1922, before F-M Diesels came to Wolfeboro, rates were as high as 20c! F-M Diesel economies have brought successive rate reductions year after year.

PROFITS AND PLUS VALUES

1940 net profit was $7,605.30 out of a gross of $51,495.80. Taxes were lower by $2613 and current was supplied free for most municipal purposes.

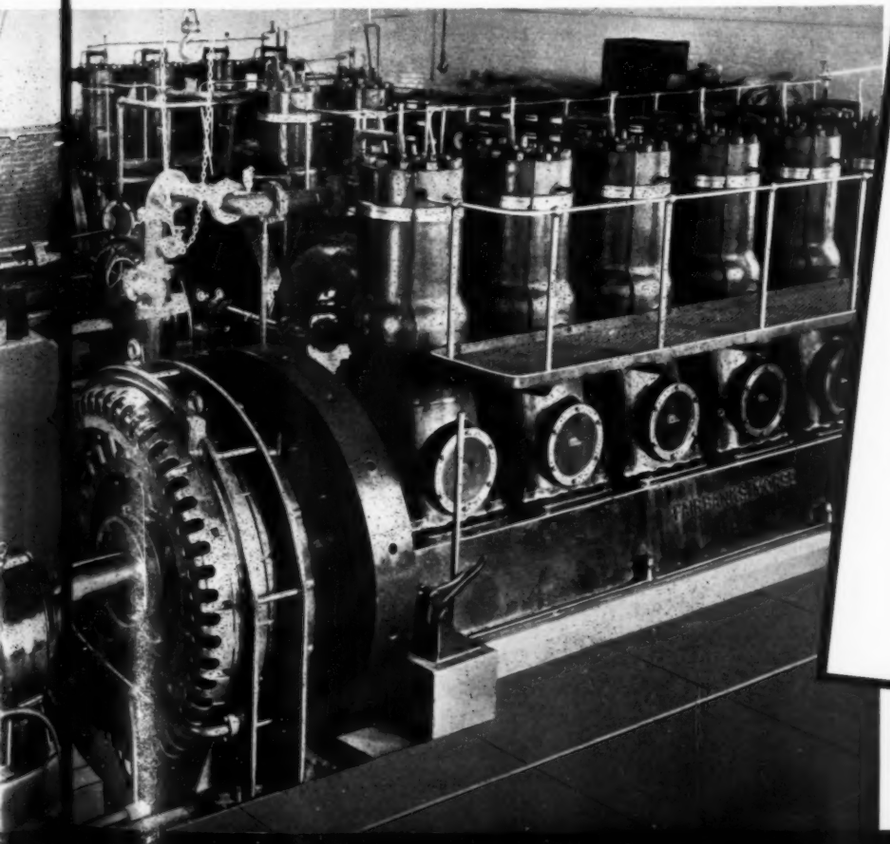
Street lights cost Wolfeboro less than 1c while the New Hampshire average is from four to five times that amount.

In the trying 1930's, free electricity kept an industry from leaving for consolidation elsewhere. Thus the power plant kept 75 families on a local payroll.

YOUR TOWN MIGHT SHOW AN EVEN BETTER RECORD

With lines extending to summer cottages and camps 40 miles from town, Wolfeboro is profiting with F-M Diesels *in spite* of partial winter idleness of facilities.

Your town might show an even better record with F-M Diesels. Write Fairbanks, Morse & Co., Dept. E24, 600 S. Michigan Ave., Chicago, Ill. Branches and service stations throughout the United States and Canada.



So much for what Wolfeboro has done for its citizens, but what has the Diesel builder done for Wolfeboro?

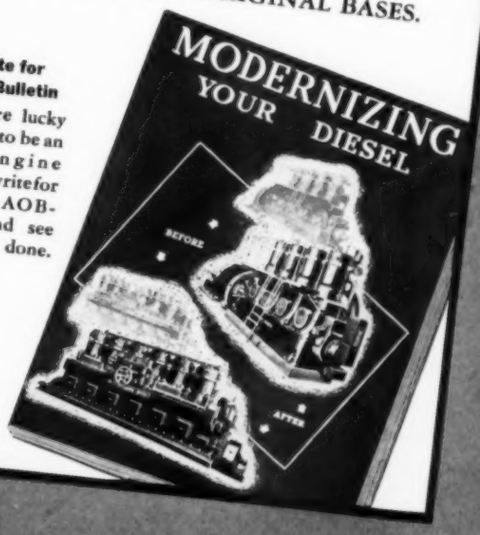
★ ★ ★

Many Diesel manufacturers might consider the normal rendering of excellent service on old equipment adequate. Not so with Fairbanks-Morse, who not only bring out progressive improvements in its new models but make such improvements interchangeable on its old engines . . .

RIGHT ON THEIR ORIGINAL BASES.

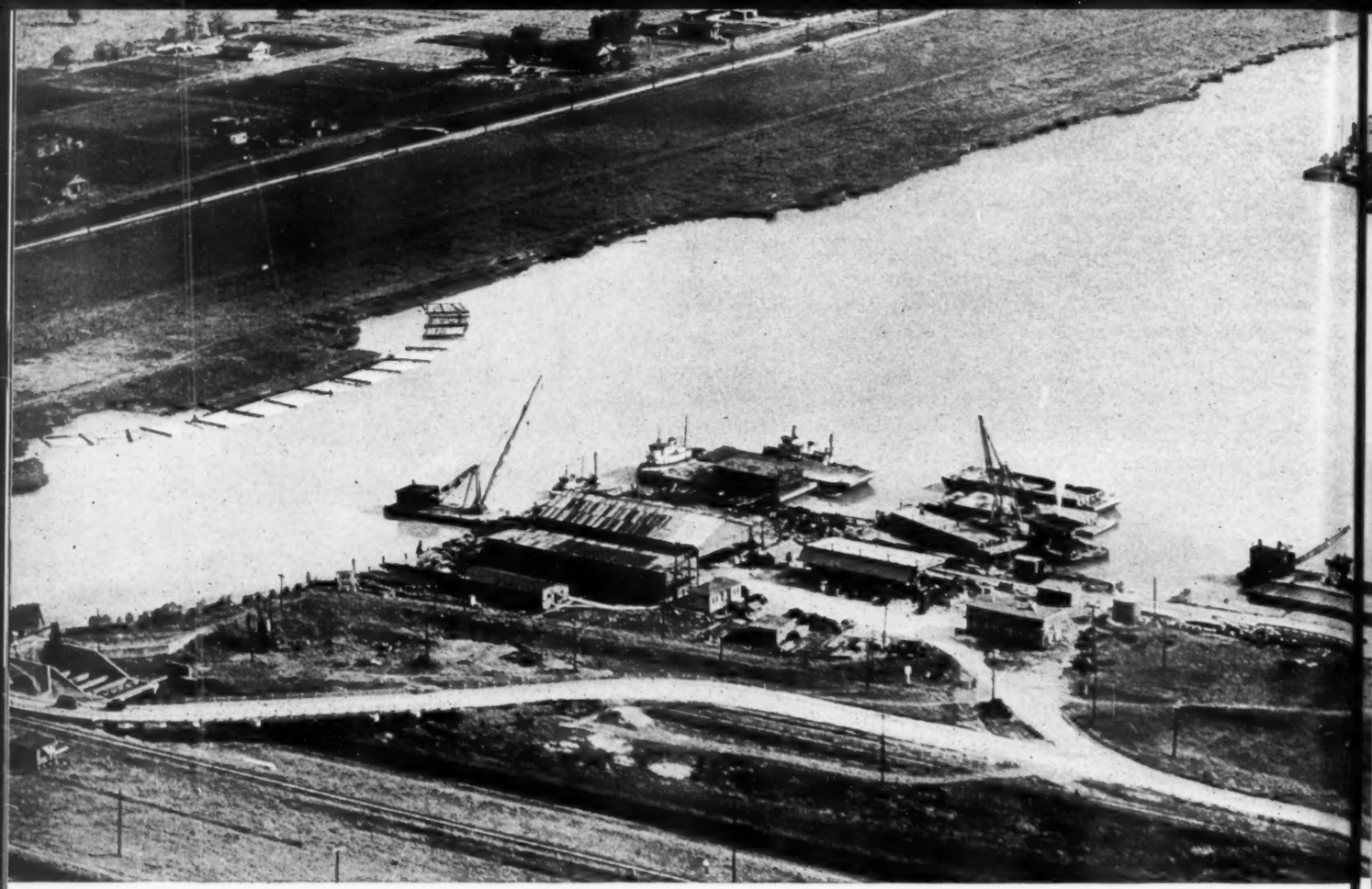
Write for Free Bulletin

If you're lucky enough to be an F-M engine owner, write for Bulletin AOB-100.2 and see how it's done.



Diesels

F M



Air view of the Lester F. Alexander shipyard, New Orleans.

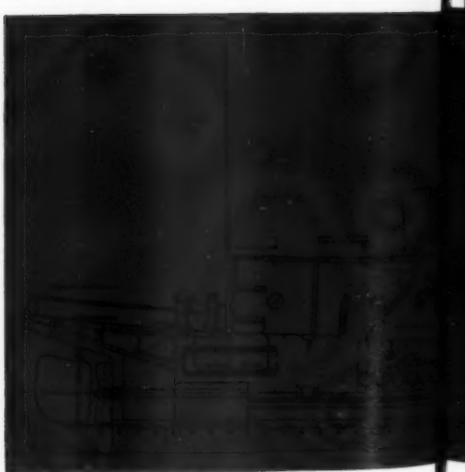
THE Lester F. Alexander Company of New Orleans may not be the only shipyard in the country to build steel tugboats upside down but it was the first, and still is the most consistent advocate of this method. Four new vessels recently completed, the *"North Wind"*, *"South Wind"*, *"East Wind"* and *"West Wind"*, have now joined the many other "Alexander tugs" to prove the merits of this construction.

Colonel Lester F. Alexander, President of the company whose wide practical experience dates back to service with the United States Army in Cuba before the turn of the century, is an outstanding river and harbor contractor as well as ship builder. As an Inspector for the U. S. Engineering Department he was the first man sent out for construction of jetties on the Southwest Passage of the Mississippi River to bring deep water to New Orleans. It is only natural, therefore, that his forty years of varied experience in using tugboats under all conditions of service should be reflected profitably in their design and construction.

Aside from the *North Wind*, which is 80 feet long with 400 hp. on the shaft, these latest tugs are from the same plans. Principal dimensions are: 65′-0″ x 17′-0″ x 7′-3″, with a 3″ parabolic crown to the deck. Each is powered by a 6 cylinder, direct-reversible Atlas-Imperial Diesel turning a 60″ x 36″, 3 blade Columbian Bronze propeller.

General features of construction such as complete 360 degree vision in the wheel house, comfortable quarters all above the weather deck, unusual machinery accessibility, and a large, well-lighted engine room show a thorough appreciation of practical service requirements. Each tug carries 5000 gallons of fuel in wing tanks and 1400 gallons of fresh water. Ballast tanks permit accurate trim for most efficient operation in deep or shallow channels. Both inboard and outboard tailshaft bearings are Goodrich rubber for protection against sand and mud frequently encountered in canals and bayous. A Young heat exchanger provides fresh water cooling for the Diesel engine for the same reason.

Other auxiliaries are typical of this type vessel. Electricity is supplied from a tailshaft generator or from a small Diesel, which also drives a Quincy compressor and Viking pump. Edison batteries float on the line. Not so typical, however, is the entire electric distribution panel located in the pilot house with all lines in conduit. The latter illustrates how many small but important items are handled to assure maximum safety as well as long life and availability with a minimum of maintenance. This policy of subordinating cost to materials and workmanship is easily understood since Colonel Alexander has never built a tug or barge on order and expects to operate any equipment he



Inboard profile of the tugs "East Wind" and "West Wind".

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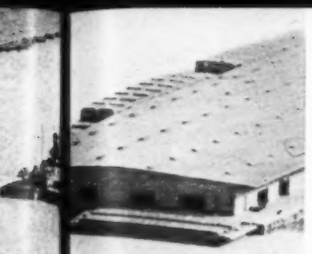


Colonel Lester F. Alexander.

UPSIDE DOWN DIESEL TUGS

Down-ha[illegible]nction.

builds if it is not leased or sold when finished. Contrary to the practice of many fleet owners, Colonel Alexander fits his tugs to their engines rather than selecting an engine to fit a hull. After deciding upon the size of engine, he determines the largest economical hull that it will drive, on the theory that a heavy boat with momentum will handle a heavier tow than a lighter boat with more power, which is the result of wide experience in the towing field.

Personally supervised rugged construction is an outstanding feature of all Alexander tugs and can best be explained by an accident involving the *J. L. Dickey* on the Mississippi River. This boat, powered with a 275 hp. Atlas-Imperial Diesel, was towing three 550 ton barges loaded with sand and gravel when a tanker split the tow one night about midnight. The impact stove in the forward barge for fifteen feet to its first water-tight bulkhead and plunged the entire crew except the engine room force into the river. The *Dickey* heeled over until her stack took water and then righted herself, swinging on her after line. Every light on board was shattered and there were fifteen inches of water in her galley, but she collected her barges and proceeded to tie up under her own power. Inspection showed only some outside paint cracked, aside from the damage to the lights and wiring. Further data on this same tug shows her speed and seaworthiness in open water. During a February storm she made the outside run from Key West to Pensacola and thence through the Intra-Coastal Canal to New Orleans, a total distance of approximately 800 miles, in 76 hours. Such operation is typical of this fleet, built by its owner for his own use, and backed by forty years of practical operating experience, both private and in government towing service.

The Lester F. Alexander Company maintains an average of fifty barges in its own employ together with floating derricks, pile drivers and other general contracting equipment. In addition, the shipyard produces 100 to 1500 ton barges, dredges and tugs totalling about fifty units each year to replace those sold or leased. The yard is serviced entirely by floating cranes and all materials are delivered by barges. The "upside down" tugs are welded under cover in two pieces, hull and deck house. When fabricated, they are rolled to the water's edge, the hull is turned over and the deck house is then welded in place. Savings in cost and time afforded by this method are obvious. The results speak for themselves in profitable operation. Now, more than ever before, such efficient production and dependable performance are of the utmost importance to expansion of coastwise and inland waterway commerce for national defense. Colonel Alexander's activities demonstrate his complete understanding of commercial and military requirements. His utilization of Diesels for economy and maximum availability contributes materially to both.

BROWNFIELD TEXAS

By ORVILLE ADAMS

THE city of Brownfield, Texas, the center of a progressive agricultural community in West Texas, started in to produce its own power and light more than 15 years ago, at which time it installed two Diesel engines, one a 100 hp. Fairbanks-Morse VA in 1924, and a 240 hp. Fairbanks-Morse in 1926. A few years later, an abundance of natural gas was developed in this section, and two Bruce McBeth engines, each rated at 250 kw. were added to this plant. The ownership of a municipal light and power plant together with other utilities has been a great advantage to Brownfield. With the continued growth of the city, and the development of various enterprises in the community, more power had to be added in 1938. This time a Type JTB-8, 8 cylinder Cooper-Bessemer convertible gas engine was installed. It is a 13 x 15 gas or 12 x 15 Diesel, operating at 400 rpm., and rated at 543 hp. or 300 kw. at this altitude.

Within very recent years, the load has practically doubled, due to the increased use of current for air conditioning, more street lights, improvements in water works, etc., with the result that a new 1200 hp. Worthington Engine was added last year to take care of the increasing demand. The six engines now afford ample reserve and standby, and permit the greatest possible economy of operation.

It is said that the greatest gas producing area in the world is in West Texas, where gas is available for the operation of internal combustion engines at a rate average of 14 to 15 cents per thousand cubic feet. With the new Worthington engine, producing a horsepower hour at full load for 9000 btu. or less than 1 cu. ft.,

the cost of power is extremely low. The cost per kilowatt hour for fuel in this plant is just a few mills.

The new Worthington engine is the well known "20 x 25 Engine" for Gas operation rated at 1200 hp. at 225 rpm.

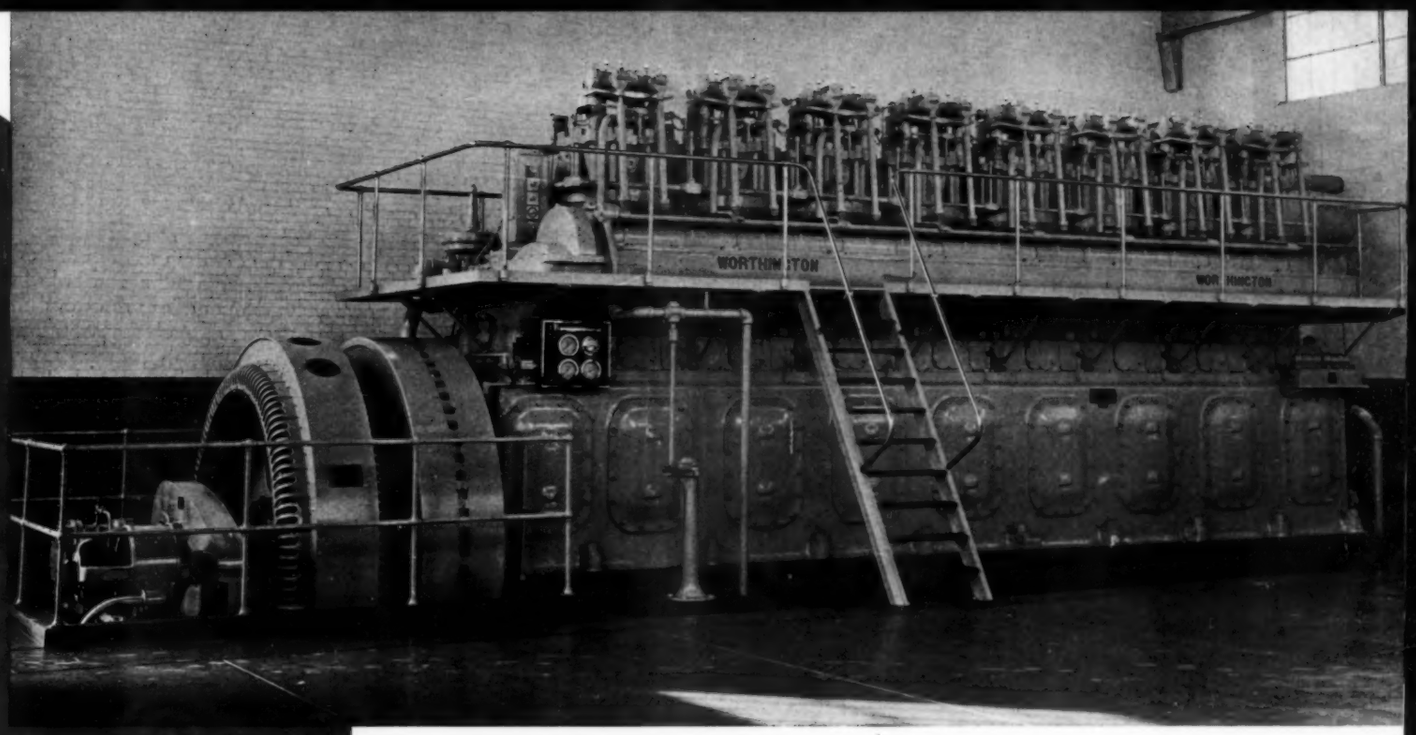
This particular engine has silicooled pistons and pressure lubrication throughout. The exhaust valves are water cooled, and there are special arrangements to prevent the entrance of dust and sand into the inside of the engine, an important feature in this region where dust storms are frequent. The installation features are very interesting and include a full complement of auxiliaries and good engineering. The exciter is chain driven by a silent chain, with very short centers, making a close compact arrangement at the generator end, and eliminating exciter drive outside the outboard bearing. The foundation floor is insulated from the engine room floor by means of cork.

A new power house was built, and looking to the future, the new building was made large enough to accommodate three more engines of this size. The new building is the latest type and design, with modern and up-to-date ventilation features, and extra good lighting both natural and artificial as will be indicated by the photograph of engine room and the new Worthington Engine. The new cooling tower is also a part of the recent improvement program, which includes a modern, expertly designed cooling system with closed circulation and a softener unit for conditioning make-up water. The engine has a light gray paint job, while the floor of the engine room is dark maroon, which prevents reflection of the abundance of natural lighting during the day time.

Having always been successful as a money maker and a low cost, efficient operation, the town has been able to reduce its tax rate to a very low figure. The savings thus has been returned to the people in the form of free illumination, deemed city improvements, and betterments which have been made out of the power plant revenue from time to time.

For the purpose of making the recent additions and improvements, a revenue bond issue of $90,000 was authorized, which are to be retired by revenue from the operation, and thus pay for the cost out of earnings as has been consistently done in the past.

With the installation of the new engine, complete lubricating oil reclaiming systems were installed, thus affording additional economy and reliable [illegible] parts. This includes a lubricating oil filter, and a lube oil cooler. The lube oil pressure is controlled by an alarm system. Protection of the working cylinder and reduction in maintenance is made possible by the use of a new type oil bath air filter. This filter can properly handle the highly contaminated air that sometimes accompanies the dust storms in this region. An interesting feature of the exhaust system is the extension of the exhaust header horizontally to the outside of the building where it connects with a modern exhaust silencer for direct discharge into the air. The exhaust temperature is indicated by the py-



...hington engine installed at Brownfield, Texas. Note Manzel lubricator at right side of photograph.

...meter, the dial of which is mounted with ... instrument board on the engine. All the dia... gauges and instruments so indicate pressure and temperatures are mounted on an angle instrument panel which is attached to the governor end of the engine, where it is convenient to the operator. Much depends upon the reliability and suitability of the cooling system in this region. The modern cooling tower is the open draft type, with a heat exchanger for operation as a closed cooling system. The make up water for which is supplied by a regular water softening unit using the zeolite principle.

The usual hydrostatic prime-mover governor of the internal combustion engine type is used. Close regulation and steady operation is maintained, since each cylinder of the engine has its own gas metering valve, a perfect balance of load between cylinders is provided for, thus assuring practically 100 per cent uniformity in operation. This is analogous to the adjustment of individual fuel pumps on Diesel operation. With the new power house and the recent installation, there was also provided a modern switchboard and electrical equipment. A word about the efficiency of the cooling system. Each cylinder has an individual water jacket. The water first passes through the water jacket, and then enters the cylinder head through external water ferrules. Properly placed baffles guide this water through the cylinder head, and it is discharged through a flow-regulating valve to the exhaust manifold from which it is carried to the cooling tower. The cylinder jackets have cover plates which can be removed for the purpose of finding any scale accumulations that result from impurities in the water. A similar cover plate is found on the cylinder heads. This regulated flow of water, and the maintenance of scale free jacket parts prevent the destructive heat stresses as well as insure good lubrication. The individual cylinders are fitted to a common water cooled exhaust manifold. Very little opportunity exists for the accumulation of destructive heat stresses in this thoroughly modern Diesel engine.

The pressure lubricating system for all working parts is an interesting feature of this engine. A lubricating oil pump of the gear-driven type takes the lubricating oil from an independent oil sump tank and forces it through a suitable strainer and an oil cooler to the main lubricating oil header. From the header, the connections run to all of the main bearings, the camshaft bearings, cam rollers and pins. The oil passes from the main-bearings through drilled holes in the crankshaft to the crankpins, and then upward through drilled holes in the connecting rods to the piston pins themselves. The oil reaching the pins is passed upward into the piston and circulated in a manner that affords very ample cooling of the pistons. The oil returns through a second passage in the wrist pin where a connection is provided through which the oil is discharged into a slotted pipe through which it returns to the crankcase and the sump. No stuffing boxes or swinging joints are used in this construction, and great reliability and satisfactory operation is assured. This is one of the most talked of features of this engine.

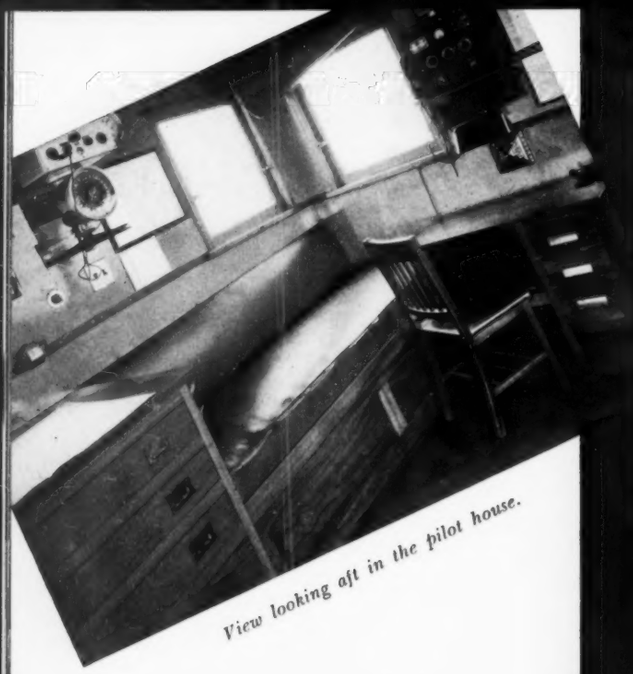
The mixing valves, one for each cylinder, are of the throttling type. These valves are each fitted with independently adjustable valves controlling the air and the gas. Separate adjustments are afforded for both air and fuel gas, but both valves operate as a single unit under governor control. The inlet, exhaust, and air timing valve cams are of steel, hardened and ground, and all cams are rigidly secured to the camshaft after alignment. All the bearings and valve gear are totally enclosed and pressure lubricated.

The engine is started by compressed air which is admitted to the cylinders in predetermined sequences, each cylinder having an individually timed starting valve operated by the camshaft to admit air to the cylinders. A single, quick opening master air valve controls the admission of the air to the starting system, a feature that is late in design and unique for this type of engine.

The accessories for this new Worthington include governor by Woodward, air compressor by Ingersoll-Rand, switchboard and generator by General Electric, lube oil filter by Hilco, air filter by American Air Filter, pyrometer by Alnor, heat exchanger by Griscom-Russell, cooling tower by Binks, valves by Crane.

The city officials and the people are justly proud of their power and light plant, and according to Mr. E. D. Jones, General Superintendent of the utilities, the people realize that the municipal plant and utilities is the best things that the city owns.

The writer is indebted to Mr. Jones for his cooperation in connection with this article.



View looking aft in the pilot house.

DIESEL TANKER "A. H. DUMONT"

DURING the hectic days of the 1920's, a young man with an idea and a tugboat much in need of repair, but without funds, convinced a New York shipbuilder of the soundness of his idea. The eventual result was the Spentonbush Fuel Transportation Service, Inc. This organization which began with one tugboat, plus an idea and financial support, grew and prospered until now, in 1940, a great fleet of more than fifty ships, including tankers, barges, tugboats and additional auxiliary craft, operate along the North Atlantic Coast and in the Great Lakes. From the beginning, both the operator and the shipbuilder have shown a preference for Diesel engines for propulsion and for pumping and auxiliary services.

During recent years, many improvements in design have been made in tanker hull design and in machinery application which have resulted in material benefits to the ship owner. The increased use of, and experience with welding in hull construction have brought about a considerable reduction in total weight with a consequent increase in carrying capacity. Likewise, improvements in Diesel engine design and performance have acted to increase operating efficiency and economy.

These and other features have been combined in the *A. H. Dumont*, a tanker unique in many respects, which was built in the yard of the John H. Mathis Shipbuilding Company in Camden, N. J. The vessel, which has a capacity of 12,000 barrels, is used for transporting oil and gasoline along the North Atlantic Coast and between Great Lakes ports.

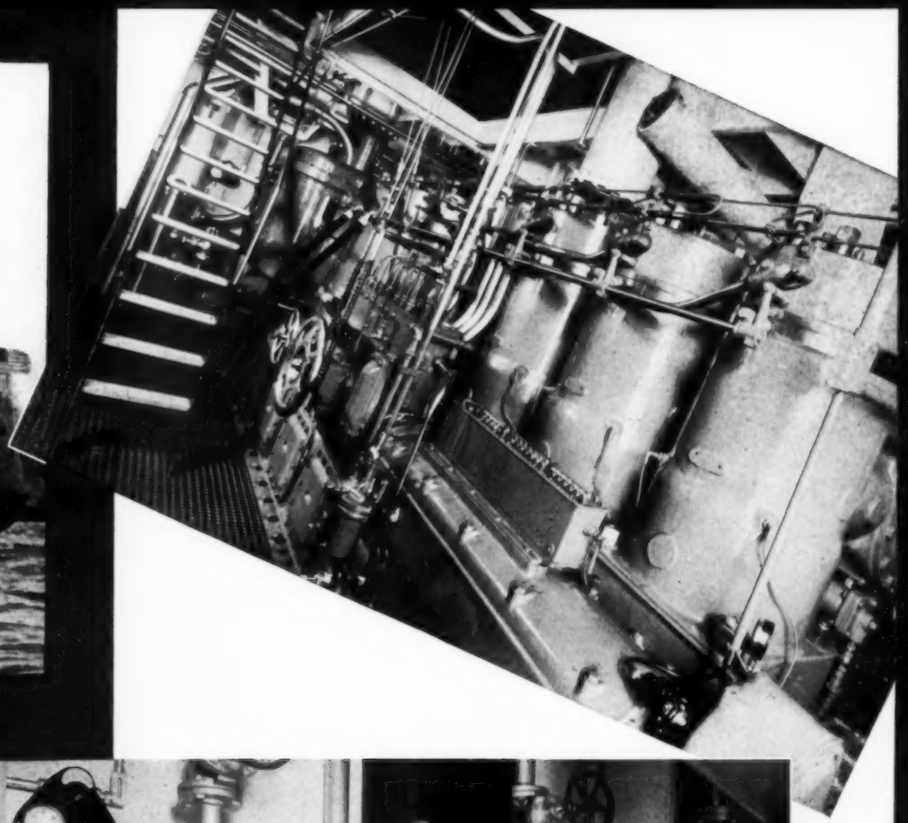
The hull is of all welded steel and is uninsulated. There are six tanks or compartments for cargo storage. Longitudinal framing is used and Vac-Rel valves are installed to rid the tanks of occluded gases after the cargo has been removed. The vessel is 213 feet long, 37 feet in breadth amidships, and 14 feet in depth, with a normal draft of 12 feet. Average cruising speed is about twelve knots.

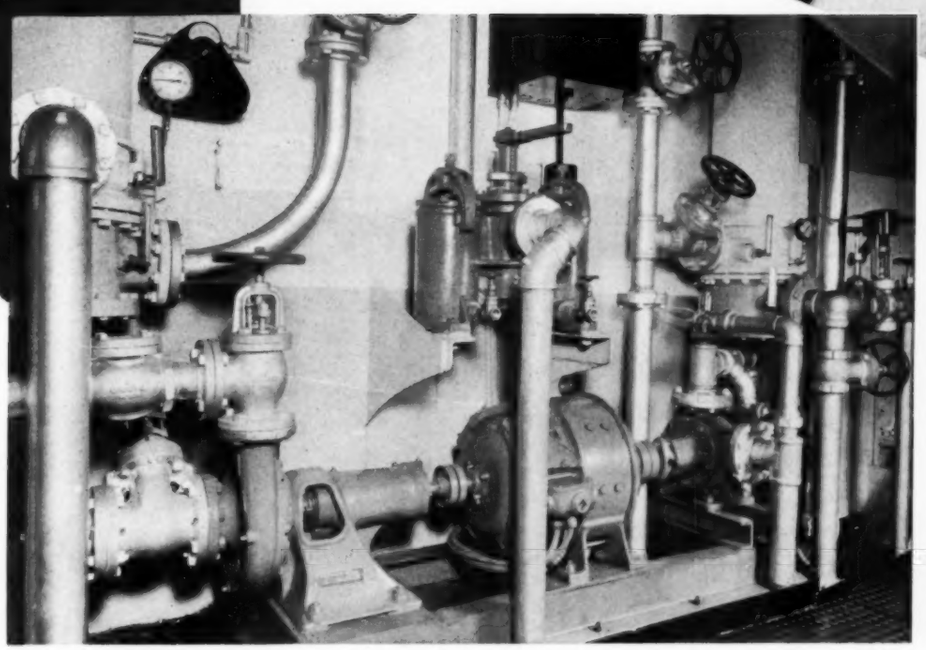
In relation to her power and speed, the *A. H. Dumont* is unusually navigable. She carries maximum power for her size and type, although capable of minimum draft for her capacity. Hull, engine, shafting, and propeller have been engineered so that the ship is free from vibration at all operating speeds.

The layout of the engine room, worked out jointly by the designer and the engine builder, is such as to produce an unusual economy in space, to facilitate attendance of the propulsion engine and auxiliaries, and to make for general convenience and accessibility. Engine room arrangement and location of fuel and lubricating oil supply tanks has resulted in making available a maximum of space for cargo.

The propeller is direct coupled to an 805 hp., two cycle Fairbanks-Morse directly reversible Diesel engine. The main engine has built-in air compressor, fresh and raw water pumps, and oil circulating pump. A Nugent fuel oil filter is used. Also a Milwaukee oil purifier, furnished by the Holcomb Engineering Company. The exhaust pyrometer is of Alnor make and a Schutte-Koerting heat exchanger is fitted in the closed main and auxiliary engine jacket cooling systems.

The auxiliary set consists of a Fairbanks-Morse, two cylinder, 20 hp., Model 36, electric start Diesel engine mounted on a common bed plate with a 12 kw., 110 volt Fairbanks-Morse generator, a 135 gpm. Northern rotary pump, and a Fairbanks-Morse air compressor. Auxiliary engine units are mounted on Korfund vibro-isolators. A 110 volt Edison storage battery floating on the line supplies current when auxiliary generators are not needed. An attractive instrument board carries a Weston tachometer, a Seth Thomas clock, and engine gauges. The Smith-Meeker Engineering Company supplied both the instrument panel and main switch-





Top: View of the 805 hp. Fairbanks-Morse Diesel, below which is shown the cooling water pumps. Note Alnor pyrometer.

board. Other auxiliaries include a Bludworth marine direction finder, a Western Electric ship-to-shore radio telephone, and an Electro-Dynamic 20 kw., 750/1350 rpm., 120 volt tail shaft auxiliary generator. Burgess Snubbers are used on the Diesel engine exhaust lines. There are two Northern cargo pumps each driven by an Atlas Imperial four-cylinder 7" bore, 8½" stroke Diesel engine, rated 80 hp. at 650 rpm. Thus powered, each pump has a capacity of 1250 gpm. or 2500 barrels per hour. These pumps are capable of unloading the tanker in from five to six hours.

The *A. H. Dumont* was launched in December, 1939, and completed in February, 1940. Here is a brief resume of the Log. First cargo was taken at the Sun Oil depot, from which point she sailed for Providence, R. I., in the late afternoon of February 17, 1940. She then remained in New England coastal service until early in May. On May 11, the *A. H. Dumont* left Newark, N. J., for Montreal, Canada, arriving there May 18. She then operated between Toledo and Montreal with an occasional trip to Toronto, transporting oil and gas from the Shell terminal at Toledo for distribution from Toronto and Montreal. At the close of the lake season, she left Montreal on October 7 for New York City, arriving at the Tide Water Oil Plant at Bayonne, N. J., on October 13. Two days later, on October 15, she put into Bushey's yard in Brooklyn for tank cleaning and painting. After a brief stay the *A. H. Dumont* resumed operation on the North Atlantic coast.

In the period from February 17 to October 13, 1940, her main engine operated a total of 3,594 engine hours out of a total elapsed period of 5,736 hours. In other words, the engine was in actual operation 63% of the elapsed time. Her engine room log showed a fuel consumption for the 3,594-hour period of better than 30% under the manufacturer's guarantee for full load. Lubricating oil consumption during the above period remained well below the manufacturer's estimate. Ship's log showed layovers for above period to be only long enough at receiving and delivery to load and discharge the oil, or gas cargo. As a rule this period averaged from six to seven hours.

GAS-DIESELS AND GAS ENGINES POWER HUGE RECYCLING PLANT

IN the world's largest high pressure condensate recovery and pressure maintenance plant of the Costal Recycling Corporation, Banquete, Texas, in the Agua Dulce field, is found more evidence of internal combustion engine suitability. Here are five gas-engine-driven, right angle compressor units of 800 hp. each and three convertible gas-Diesel electric generating units of 400 bhp. each which supply all of the power for the operation of this project. And it was not the mere abundance of ideal fuel that dictated the selection of these prime movers as will be seen.

This plan is designed to process 128,000,000 cu. ft. of gas per day, removing both gasoline and kerosene from the gas and returning it to the formation for pressure maintenance. The various processes are well known to the field brotherhood and a full treatment of all phases of this operation is beyond the scope of this article. Briefly, however, the plant consists of three major divisions. First, an elaborate piping system for collecting the gas from producing wells and for returning the gas to the input wells. The gas-gathering system is designed to operate at 2,000 lb. per sq. in. working pressure and the input system at 2,500 lb. per sq. in. working pressure. It is the gas-engine-driven compressor units that handle the gas through this system. These units constitute the pressure maintenance division of the plant which properly takes the processed gas from the stripping unit, returning it to the formation via the input wells. The third division is the high-pressure absorption unit designed to operate at 1,500 lb. per sq. in.

Each of the five main compressor units consists of a row of eight vertical, 2 cycle, gas-burning power cylinders. One unit has three 4⅛" double-acting gas recycling compressor cylinders and one double-acting recompressor cylinder. On each of the other four units are four 4⅛" double-acting compressor cylinders.

All compressor cylinders, as well as the double-acting scavenging cylinders, are horizontal. The auxiliaries are simple, well arranged, and constitute all desirable engine protection. Driven from the layshaft are governors, magnetos, and cylinder lubricators. The governors are of the centrifugal type, hand wheel adjusted and are built-in. The lube oil pumps are driven from the end of the crankshaft. Lube oil is picked up from the crankcase by a gear-type pump which forces it through a duplex filter, thence through the cooler after which the oil enters a header from which it is distributed to the main and crankpin bearings under pressure. The mechanical force-feed lubricator delivers lube oil to three points in the periphery of each power and compressor cylinder, thus insuring complete lubrication of these parts.

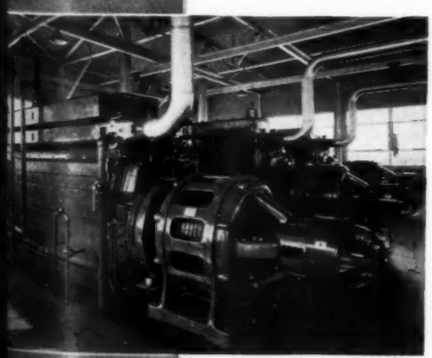
Oil cooling is provided for all pistons, the oil being conducted upward through the connecting rod and piston, thus cooling the top rings as well as the piston crown.

Each compressor unit is protected by a self-cleaning oil bath type air cleaner with a capacity of 5,000 cu. ft. per min. Each cleaner will trap and retain 200 lb. of dirt without showing an increase of pressure drop across the filters. The power units are protected by multipoint exhaust temperature pyrometers, the usual gauges, and water temperature and lube oil pressure alarms.

When it came to the selection of prime movers for pumping duty about the plant, several types were considered. The total full-load pumping duty is approximately 500 hydraulic hp. In addition to lighting, the electrical load is imposed by 25 motors for various services, ranging from 3 hp. to 100 hp. throughout the plant.

Steam drive for this load would have required about 1,700 boiler hp. This type of drive was eliminated due to complications which would result from polluted water supplies. Individual gas engine drives for each pump were considered and discarded because of initial cost and maintenance expense. The deciding factors in the selection of electric motor drives taking power from a central gas-engine electric gener-

The five main Clark compressor units in the Banquete, Texas, plant of the Costal Recycling Corporation. Note Pickering Governor, extreme left, and McCord lubricators.



The three Clark Type 8 gas engines, shown above, are in the Costal Recycling Corporation's plant illustrated at the left.

ating plant were a decidedly lower first cost, the promise of lower maintenance cost, and by far a neater and more conveniently arranged installation of the prime movers.

In a separate building are installed the three convertible gas-Diesel gas burning electric generating units. Each engine is rated 400 bhp. at 600 rpm. These engines are distinguished by full enclosures, compact design and facile convertibility for fuels of varying ignition quality. To convert these engines for oil fuel, it is only necessary to change the cylinder heads. The fuel system consists of a regulator which supplies gas to the mixing valve at 5 to 6 oz. pressure. The mixing valve is located at the end of the intake manifold near the governor control. The engines are protected by automatic shut-down devices which operate on low lube oil pressure, high cooling water temperature and over speed. A spring loaded decompression lever which can be tripped manually opens all exhaust valves and will stop the engine immediately in the event of an emergency.

The large cooling tower installed to handle this entire operation is of the forced draft type, employing seven, 138″ fans and has an overall length of 192′ 10″, a width of 24′ 10″, and a height of 39′ 6″. It has a capacity of 8,000 gallon of cooling water per minute.

The magnitude of this operation may be realized from the foregoing although a full presentation of the facts about this interesting plant has been impossible here. The actual power equipment and accessories may be summed up as follows: Five 8 cylinder "Angle" gas compressor units burning gas fuel, totaling 4,000 hp., and three gas burning, convertible electric generating units totaling 1,200 hp. by Clark Bros. Co., Inc.; generators by Westinghouse; lube oil filters by Purolator; governors, centrifugal type on the compressor units and 3,700 class on the generating units, by Pickering; safety controls by Marsh; air cleaners by Vortox; exhaust pyrometers by Alnor; cooling water pumps by Deming; cooling tower by Marley; and force feed lubricators by McCord.

DIESELS

PUT A PROFIT

IN TRUCKING

MANY truck operators were on the very edge of profitable operation when Diesels came into the picture. Truckers had looked for new ways to cut costs and to these, the automotive Diesel was godsent. Records of many operators show that their profit is the difference between the operating costs of gasoline and Diesel engine power.

The total extra profit that comes to Diesel operators has many sources. First is fuel economy. The Diesel truck travels approximately twice as many miles on a gallon of fuel as a gasoline powered truck. This is the most important fuel saving but another which should not be overlooked is fuel cost difference.

The second saving comes from dependability and lower maintenance. Where a gasoline engine needs a valve grind after 30,000 miles of operation, the Diesel travels 60,000 miles *and up* before this work is necessary. The most important saving comes from the fact that the Diesel truck is tied up but half as often for service. There are approximately ten Diesel trucks on the West Coast that have each travelled well over a million miles and are still giving dependable daily service.

The savings of Diesels offer one answer to the trucker's problem of increasing taxes. Taxes have risen steadily and are still going up. Approximately 2,750,000 trucks in 1937 paid some $135,000,000 in taxes. In 1939, there were approximately 8,450,000 trucks in use whose owners paid some $425,000,000 in taxes. In other words, the taxation of each truck in 1939 was approximately double that in 1927.

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TWIN TUGS

By WARREN GLEASON

THE tugboats in the fleet of the W. G. Coyle Company, Mr. Henry F. De Bardeleben, president, of Algiers and New Orleans, Louisiana, have long been known in the waters of the lower Mississippi River and inter-coastal canal areas for their ready efficiency and are always noticeable for their trim and polished appearance.

Several new additions have recently been made to the growing Coyle fleet, particularly the *H. F. De Bardeleben* and the *B. T. De Bardeleben*. These impressive tugs are twins in every respect, in design, construction and machinery.

Both are 80′ in length, with an overall beam of 23′ 7″, a moulded depth of 9′ 6″, a draft forward of 6′ 6″, and a maximum draft aft of 8′ 6″. Both are of 66 tons net and 130 gross; construction is arc-welded steel throughout, with flat bar keels of 1¾″ by 6″ steel, hull plating of ⅜″ thickness, 5/16″ steel decking, and 3/16″ thickness in the deckhouse structures.

Keels for these two tugs were both laid on the same day, January 29, 1940, by the Equitable Equipment Company, Inc., of New Orleans, in their yards at Madisonville, Louisiana, across Lake Pontchartrain from the city. Designated as No. 107 and No. 108 by the builders, work progressed simultaneously on the two hulls and both were launched on schedule in August. As to their readiness for work when completed, it is suggestive that on the day following the delivery of one tug to the W. G. Coyle Company, it departed for Houston, Texas, with a tow of three barges.

For the main power plant, each tug utilizes a Superior Diesel of 8 cylinders, 12½″ bore by 15″ stroke, 4 cycle and direct reversible, developing 600 hp. at 400 rpm., with 82 pounds B.M.E.P., Lube oil filters are Nugent. Lube oil coolers and pressure alarms are all of Superior design and built-in. The Diesels are fitted with Maxim silencers of the spark-arrester type. Pyrometer equipment is Alnor throughout. The cooling system is closed circuit, using the Ross heat exchanger. Cooling water pumps are Superior; tachometers are Reliance.

In auxiliary, as well as propelling power, these two tugs are all-Diesel. Each is equipped with a pair of Superior GA 4 Diesels, fitted with 25 kw., 125 v. generators, driving all auxiliary machinery through individual electric motors. Such equipment includes the two air-compressors provided for each tug: these are Worthington Model VA, 5½″ by 3⅛″ by 3½″, and are capable of supplying 337 cfm. to the four 30″ by 96″ air-cooled tanks. Fuel oil transfer pumps are Goulds, direct connected to 1 hp. Crocker-Wheeler motors.

A 125 v. dc. compound-wound Crocker-Wheeler motor drives the fire pumps, supplying 125 gallons per minute at 110′ head and 275 gallons per minute at a 40′ head. The capstan, American Engineering Company make, is electric drive with a 7½ hp. motor. Other electrical needs supplied by the Diesel-generators include, of course, the lighting system, bilge pumps, hot and cold running water, pressure systems to all toilets, cabins, showers and galleys, current for the R. C. A. radiotelephone sets and for the 36 c.f. McCray electric refrigerators in the galleys.

A CO_2 fire extinguishing system is installed throughout; as a further precaution in this regard, the galley fuel is Diesel oil, burned in an Elisha Webb 31½′ range using a Valjean oil burner. Particular attention was given to all electric wiring, the job being submitted for the approval of the local inspectors of the Dept. of Commerce, Bureau of Navigation. Though this inspection was not required for these tugs, it was invited and welcomed by the builders.

Comfort and convenience of the personnel of the crew was also considered by the designers. Besides screening and ventilation, the vessels are equipped with Westinghouse automatic oil burners, supplying hot water for cold-weather heating to radiators in all cabins and compartments. All bunks, incidentally, are furnished with berth-lights.

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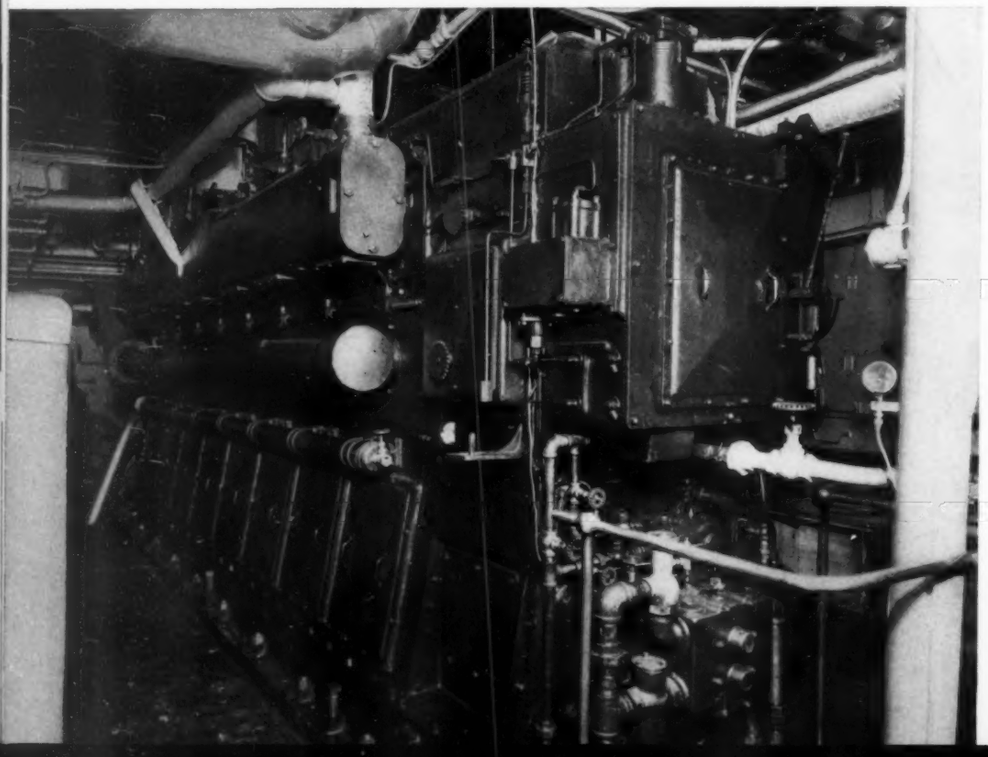
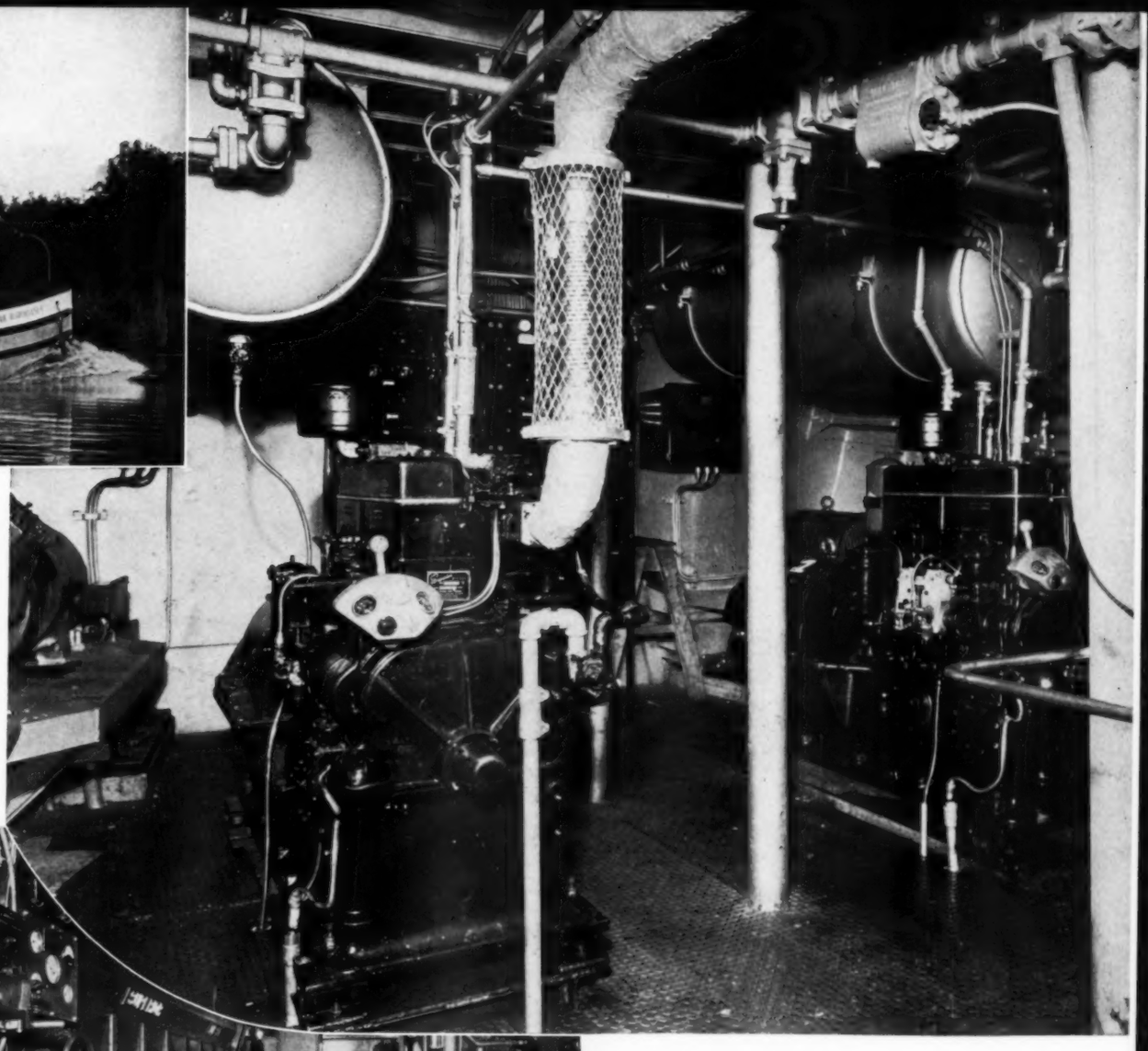
Exhaust side of 8 cylinder Superior Diesel main engine.

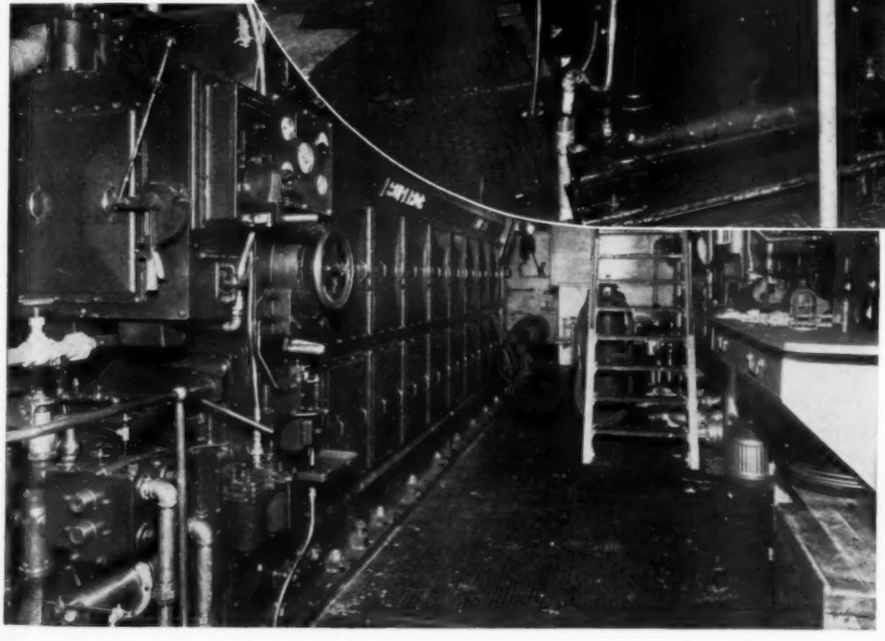


One of the twin Diesel tugs under "full ahead" in the Mississippi River.

View shows the dual Superior Diesel generating sets as installed on each tug.

Operating side of the 600 h.p. Superior Diesel propulsion engine. Both tugs are identical in design and equipment.





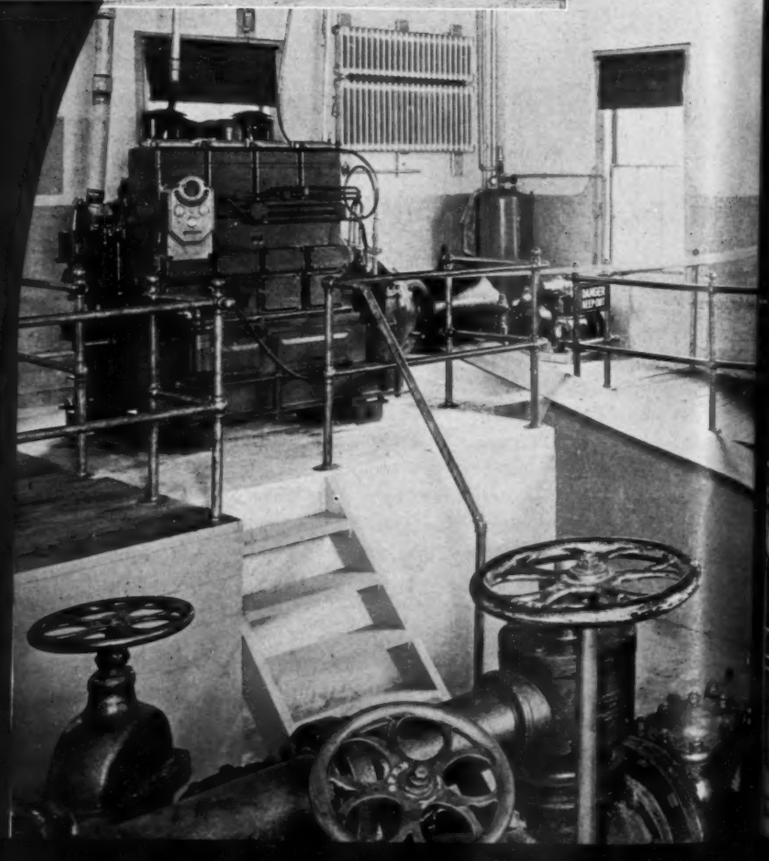
For propulsion, the Superior main Diesels turn 7″ steel tail-shafts equipped with a Guthans gland and pressure grease system; propellors are Columbian of 66″ diameter and 42″ pitch. On each tug, towing efficiency is increased by enclosing the propellor within a built-in Kort Nozzle, installation of which was supervised by Dravo Corporation. That this device is effective is reflected by the fact that these tugs represent the third such installation in Coyle boats. This nozzle housing, built completely around the propellor, enforces a continuous and equal delivery of water to the propellor under all water conditions, rough or smooth, regardless of current. Any braking effect which might perhaps be expected of the device is successfully avoided by giving the forward or entering edge of the nozzle a streamlined, airfoil section. The result is a steadier boat, no racing of the propellor, lessened vibration, substantial protection against floating drift, easier and better controlled steering and markedly increased propellor efficiency under heavy towing conditions, with consequent appreciable savings in fuel and maintenance expense.

Other features of the new tugs include 14′ steel lifeboats made by the Lane Lifeboat Co. of New York; Cunningham air-horns; 550 lb. anchors with 50 fathoms of ¾″ stud-link chain. The compass is the most modern type of hand make, with a 5″ binnacle complete with the Deviastat, permitting external and easy adjustment of the integral correction magnets.

All deckhouses are insulated with Rock Wool and ceiled with heart red cypress. Fuel tanks are built into the hull and provide a thirty-day supply.

Nine people comprise the crew, consisting of two deck officers, two engineers, a cook, and four deck-hands. While primarily intended for coastwise, harbor and inter-coastal canal service, the new Coyle twins are amply able to go anywhere the owner may find it necessary to send them.

EASTHAMPTON, MASSACHUSETTS



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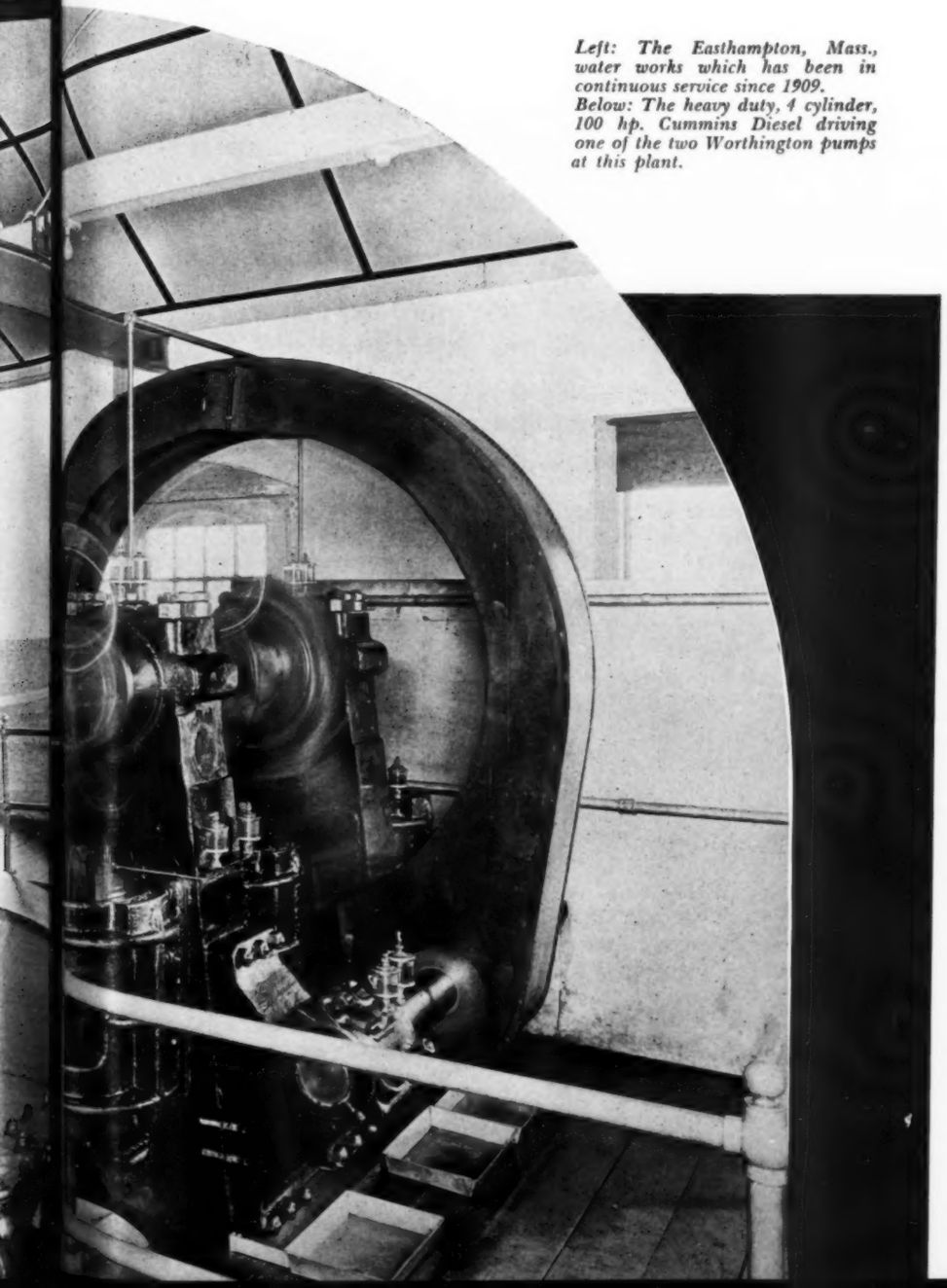
EASTHAMPTON, Massachusetts, a progressive small city of 1200 people, has some of the finest water in Massachusetts. The town is supplied from thirty-seven different 2½" wells each of which flows 25 to 30 gallons per minute. The water is 97% pure, has a constant temperature of 49° and never sees daylight until it leaves the faucet.

The city built an attractive and efficient pumping plant in 1909 which has been in constant operation since then. As they also have their own water-powered electric utility, electricity is furnished for the water plant without charge when water is abundant. Between May and September, however, the natural water supply drops considerably which usually leaves the electric plant unable to supply the pumping station with sufficient current. Formerly, during this five month period, the plant was dependent on the Turner Falls utility service, some thirty miles away. This arrangement was satisfactory except that the cost of current was high. Each of the two 100 hp. motors, driving 12" x 12" Worthington double action pumps, cost the town $1.35 per hour to operate.

In addition to a high operating cost, there was the uncertainty of even getting current in emergencies. On two separate occasions, Easthampton had been cut off completely from power. The first occurred during the 1936 flood and the other at the time of the terrible hurricane which raged through New England in September, 1938. During the hurricane, a 10 inch main broke, emptied the reservoir in four hours, and left Easthampton without water for twenty-six hours. Conditions were even worse during the flood when no water was available for thirty-six hours. For these reasons the city decided to buy a Diesel engine to power one of their pumps.



Left: The Easthampton, Mass., water works which has been in continuous service since 1909. Below: The heavy duty, 4 cylinder, 100 hp. Cummins Diesel driving one of the two Worthington pumps at this plant.

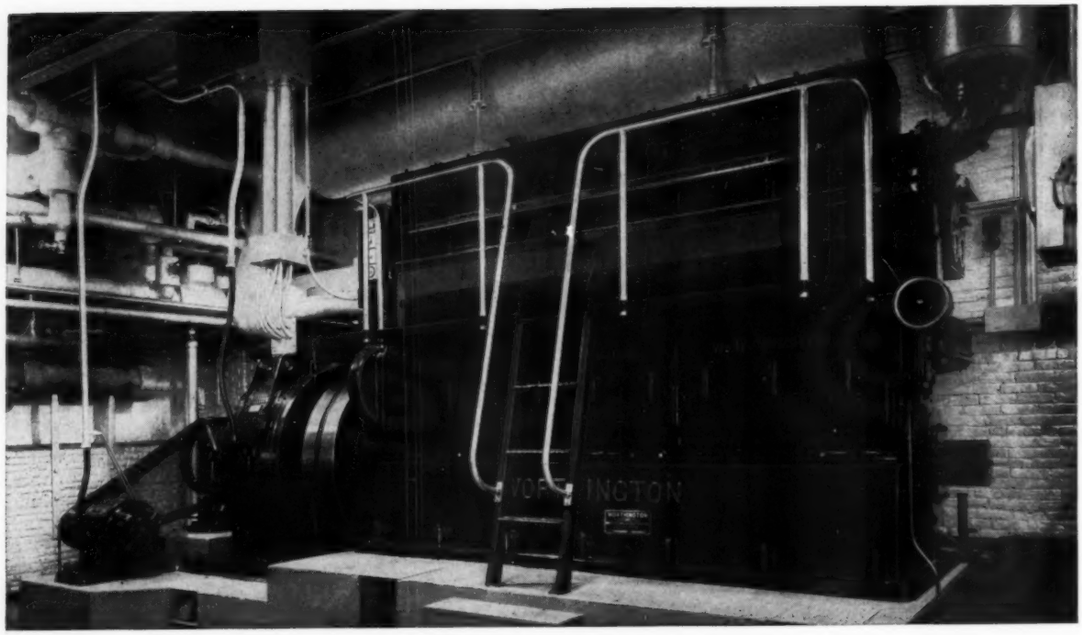
The decision was a wise one. By doing so, they not only established an important independence from outside sources but also saved $1.00 per hour over former operating costs. In August, 1939, the plant installed a 4 cylinder, 7" bore, 9" stroke, four cycle, Cummins Diesel which has a piston displacement of 1385 cubic inches and develops 100 hp. at 720 rpm.

The Diesel was fastened to "I" beams which, in turn, were bolted to the same shoes that mounted the previous electric motor. An 18" diameter Rockwood pulley and an 18" flat belt transfers power from the engine to the pump's 7 ft. diameter pulley. Pulley centers are 20 ft. and the engine can be moved if it is necessary to tighten the belt.

The cooling system is an open type and the flow of water taken from the main to cool the engine is manually set with a valve. Starting air storage tank and compressor unit are set up in a corner of the engine room. The engine exhaust pipe goes through the side wall, overhead, and then vertically through a Maxim silencer. A 500 gallon fuel tank is located outside the building some 40 ft. from the engine. The plant usually operates one or both of the pumps sixteen hours per day, the Diesel being run from three to twelve hours of this time. Production with the electric motor was 900 gallons per minute. With the Diesel engine, however, it now exceeds 1000 gallons per minute.

The Diesel uses 3.6 gallons of fuel per hour. Lubricating oil is changed every 100 hours, none being added between changes. Fuel oil costs $.07 per gallon and lube oil, $.43 per gallon which gives a total operating cost of only $.312 per hour. This means a saving over purchased electricity of some $1.038 per hour.

Water from the wells is collected in a 12 inch main leading to a 3700 gallon settling tank. From here it is pumped under a pressure of from 95 to 100 lbs. into a pair of main lines encircling the town. The town's immediate demand is drawn from these mains, the surplus travelling up to a covered concrete reservoir on the mountainside. Measured from the overflow, this reservoir is 26 ft. deep and the 2,250,000 gallons which it holds will supply the town's normal needs for fifty-six hours. A pressure of 87 lbs. max. is provided from the reservoir as it is 212 ft. higher than the pumping station.



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SUPERVISING & OPERATING ENGINEERS' SECTION

Utilization of Waste Heat from the Diesel Exhaust

By R. L. GREGORY

EVERY Diesel Plant Engineer should make it his prime objective to secure the best overall efficiency from his plant which is possible to obtain. In order to accomplish this, he must take advantage of every plant condition presenting a means toward this end. There are many such conditions found in every Diesel plant, but in this article I wish to discuss one of the principal features which for years was totally disregarded by Engineers and Manufacturers alike. That feature is the utilization of the waste heat from the exhaust lines. Within very recent years, much more attention has been given to this problem and, in most of our modern and later plants, provisions have been incorporated in the plant to utilize this waste heat. This is not the case in all plants, however, as the following incident will illustrate.

During the past summer, the writer had the pleasure of looking over a Municipal Plant of 3000 kw. rated capacity in a small midwestern city. This plant, like many others in like communities, had just grown with the community, so to speak. Starting with a 500 kw. unit, they had added three more units of varying capacities, as their load conditions demanded. No consulting engineer was hired, and the local authorities and plant personnel working with the manufacturer decided all questions as to installation and repair. The plant personnel had grown along with the plant and took the existing conditions as a matter of fact. The plant for several years had been operated on a cheap grade of light fuel oil bought from the same jobber. This oil required no preheating, and the only heat supplied to the plant came from the radiation of the engine exhaust lines which were uncovered.

The load conditions were most ideal for a plant of that size, varying from approximately 900 kw. to 1400 kw. during weekdays. Besides the domestic consumption, the plant supplied three small factories which, from the nature of their products operated on a twenty-four hour basis, six days a week. There were no apparent heavy swings and, except for peak load periods, which naturally occurred during the evening, the load was fairly constant. Their fuel, shipped in car load lots, was stored in two 25,000 gallons tanks, adjacent to the mufflers behind the plant. In talking with the plant engineer, he advised me that they would like to go to a heavier fuel, but that they felt the cost of installing a small boiler for preheating purposes was prohibitive. I asked him whether he had consulted the manufacturer on the possibilities of utilizing his waste heat, and he said that candidly he had not given that phase any consideration. We then talked the matter over and he later advised me that they had worked out a scheme, which not only allowed them to use the heavier oil and preheat it, but also had made provisions for heating the building proper by use of the waste heat.

When one stops to consider that the exhaust temperatures in a two cycle engine, operating at full load total from 350 to 550 degrees F., and those of a four cycle heavy duty unit total from 600 to 750 degrees F. in normal operation, it becomes apparent that utilization of any part of this heat, will improve the overall efficiency of the unit. When he further considers that it is possible to reclaim as high as 60 percent of the BTU content of the waste heat, he merely has added weight to the argument favoring its utilization. There are many ways of utilizing this heat. It can be used to heat buildings or preheat fuel oil as in the aforementioned instance. It can be used for heating up tank cars when unloading, for process work or used in waste heat boilers. It can also be used in keeping standby boilers warmed up for emergency use, and has been used for heating boiler feed water, although in this instance it has its limitations. Due to lower operating costs and first costs, waste heat recovery apparatus is replacing auxiliary boilers and other heating apparatus.

In our plant we heat the entire building by means of hot water radiators. We use a closed system, with a small motor driven pump of ample capacity to keep the water in constant circulation. The suction of this pump is connected to the common return from the radiators. The water is then pumped through a heating coil located in the muffler and back through the radiators. In order to insure safe operation, an expansion tank is connected into the system. This tank is equipped with a pressure gauge, calibrated at 0–50 lbs., and a relief valve is located in the drain from this tank. We carry approximately 10 lbs. pressure on the system, with the relief valve set to release at 25 lbs.

Since our 2250 bhp. unit operates only during the heavy load period or a period of eighteen hours a day normally, we made further provision to insure good heating, when the unit is down, by installing a small heat exchanger just ahead of the pump. We have ample steam from our steam plant and when the Diesel is not operating, steam is turned into the heat exchanger and the water kept hot by this method. A trap is connected to the steam exhaust end of this heat exchanger.

Some plants use practically this same system, substituting unit heaters, thermostatically controlled, in the place of radiators. This system gives fairly good results, but the room temperature cannot be kept at as uniform a temperature with this method, since the adjacent air effects the thermostat and cuts off the heater prematurely or before a uniform room temperature has been attained.

Another method of reclaiming the waste heat is shown in the accompanying photo. In this

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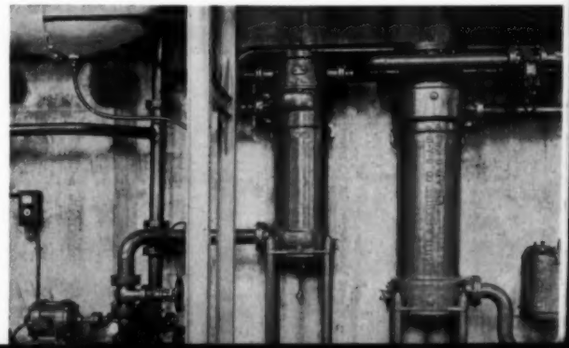

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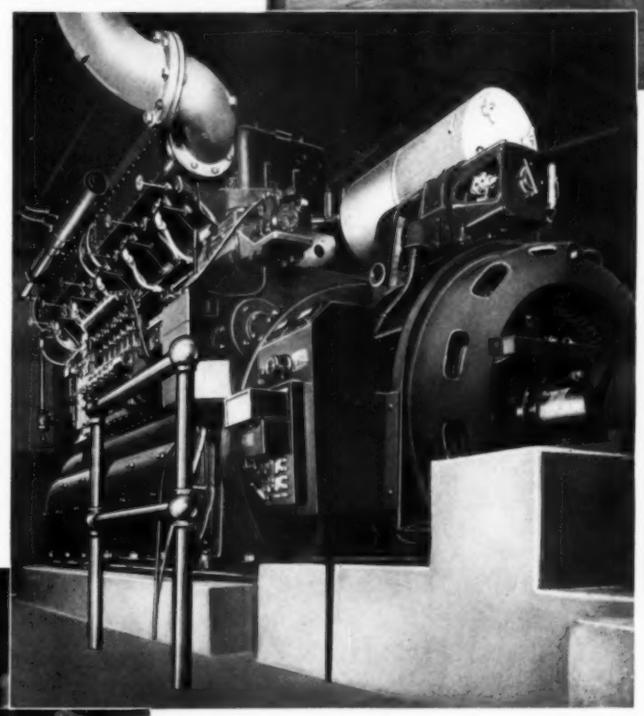
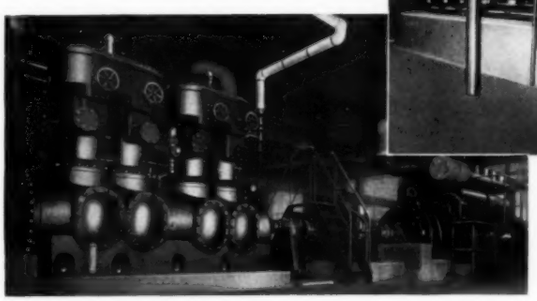
An ALCO DIESEL *for* UNIVERSAL APPLICATION





This Alco Diesel, due to its exceptional ruggedness, is eminently suitable for heavy duty services. It is in successful operation in Tankers, Tug Boats, Cutters, Hydraulic Dredges, Cargo Vessels, Public Utility and Municipal and Industrial Power Plants, Irrigation, Oil Pipe Lines, and Railway Motive Power.

An Alco, four cycle, six cylinder Diesel engine rated at 540 B.H.P. at 600 R.P.M. was recently installed in the Serota Ice Company plant at Brooklyn, N. Y. It is now handling the major electrical and compressor loads for the production of 210 tons of ice per day and the maintenance of a 20,000 cake reserve storage.

Another heavy duty application of the higher speed more compact standard Alco Diesel.

DIESEL ENGINE DIVISION **AMERICAN LOCOMOTIVE COMPANY** AUBURN · NEW YORK ·

Tanker "A. H. Dumont" Powered with Fairbanks-Morse Diesel Is "Alnor" Protected

Actual engine operation of 63% of the elapsed time during the first eight months of service is the record made by the 805 Hp. Fairbanks-Morse two cycle Diesel which powers the tanker "A. H. Dumont" owned by Spentonbush Fuel Transportation Service, Inc.

Wherever you find records of unusual service, you will invariably find an "Alnor" Exhaust Pyrometer used to protect the engine and to assist in obtaining maximum efficiency and economy of operation.

Whether you operate your Diesels much or little, an "Alnor" Exhaust Pyrometer will prove a profitable investment.

Specify or buy "Alnor"

Ask for Catalog

Illinois Testing Laboratories Inc.

423 NORTH LaSALLE STREET, CHICAGO, ILLINOIS

Manufacturers of "Alnor" and Price Instruments—Products of 41 Years' Experience

SONORA, TEXAS, MUNICIPAL ELECTRIC PLANT AND DISTRIBUTION SYSTEM

ACTING on bids received March 29. 1941, the City Commission of Sonora, Texas, awarded contracts for Sections 2 and 3 of the Plans and Specifications, including all power plant engines, generators, auxiliaries and accessories, and complete electric distribution system with residential street lighting to Universal Electric Construction Company of Alabama, Inc., Guntersville, Alabama, for $153,493.00.

Sammon's Electric Company of Lafayette, La., was second low with a lump sum bid on all Sections of $198,893.00.

The Columbian Securities Corporation and Associates of San Antonio, Texas, were awarded the Revenue Bonds on a bid of par and a premium of $5,000 on the issue of 4% bonds.

Work will be started immediately. Albert C. Moore and Company of San Antonio, Texas, are the consulting engineers.

★ ★ ★ ★ ★

THE E. B. Failing Auto Courts, Baker, California, has purchased a Fairbanks-Morse 14" bore, 17" stroke, 150 hp., Diesel engine direct coupled to 121 kva., 97 kw., 3 phase, 60 cycle, 208 volt, 300 rpm. alternator with multiple V-belt driven exciter. Already installed is a 75 hp., 14" bore, 17" stroke, F-M Diesel turning a 63 kva., 50 kw., 3 phase alternator of same cycle and voltage.

Another purchaser of a F-M Diesel is the Oildale Mutual Water Co. of Oildale, California. This is a 2 cylinder, 12" bore, 15" stroke, 120 hp. engine, for irrigation service. This company already has installed a 2 cylinder, 14" bore, 17" stroke, F-M Diesel geared to F-M turbine pump.

NEW NUGENT BULLETIN

WM. W. Nugent & Company announces a new Bulletin No. 7A covering not only the operation of the Pressure Oil Filter but also its complete application. One point brought out in this booklet is that any liquid containing foreign solids, as small as .0001", which will not destroy the filtering medium or its parts, can be successfully handled by this filter. This bulletin contains 28 pages and is replete with numerous illustrations. Copies may be obtained by writing direct to Wm. W. Nugent & Co., 415 N. Hermitage Ave., Chicago, Illinois.

CHANGES IN CHARLESTON SHIPBUILDING ORGANIZATION

CHARLESTON Shipbuilding & Drydock Company announces a complete reorganization and its officers are now as follows:

President, John B. Hollister; Vice President and General Manager, L. Louis Green, Jr.; Secretary and Treasurer, Elmer Hibbe; Purchasing Agent and Chief Draftsman, W. F. Martin; Naval Architect, L. Louis Green, Jr.; Superintendent, A. A. Gerken.

The Directors are: George A. Rentschler, John B. Hollister, L. Louis Green, Jr., Edward P. Farley, Preston Davis, Charles L. Mullally.

This company has recently received a contract from the Navy Department for the construction of six 205 ft. mine sweeping fleet tugs. The total amount of this order is $8,100,000 and all of the tugs are to be built in a period of twenty-six months. Charleston Shipbuilding is starting its expansion program immediately and will actually get into construction of these tugs in the very near future.

★ ★ ★ ★ ★

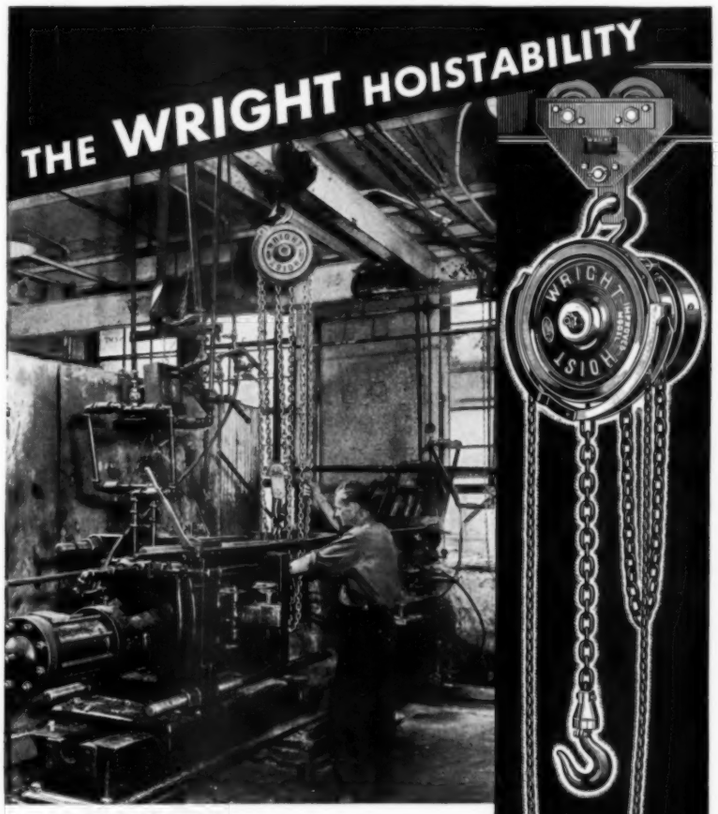
A CONTRACT for the main engines to be installed in the 80 ft. patrol boat now under construction by the Harbor Boat Works, San Diego, for the Mexican National government, has been awarded to the Superior Engine Division of the National Supply Co., Los Angeles, according to Lewis L. Livesley, Pacific Coast Manager.

The engines are true right and left, direct drive, eight cylinder, 8" bore, 10" stroke, 400 hp. at 900 rpm. Auxiliaries are expected to be of the same make.

VORTEX ISSUES MARINE BULLETIN

A BULLETIN entitled "Specifications for Spark Arrester Silencers," covering the basic principles of silencing and spark arresting, and setting forth the Vortex method of meeting these conditions, was recently issued by Engineering Specialties Company, Inc.

The bulletin emphasizes that Vortex units are designed specifically for each engine and lists the engine information which is required with each enquiry. Write for your copy of this informative bulletin No. 728 to Engineering Specialties Company, Inc., 39 Cortlandt St., New York, N. Y.



WRIGHT *Improved High Speed* **HOISTS**

HAVE "HOISTABILITY" which means vertical transportation with *speed, economy* and *safety*.

Every WRIGHT *Improved High Speed* HOIST is *fast*, smooth and positive in action—because of Wright precision load wheel and driving spindle bearings. It is *economical*, being highly resistant to corrosion because of its full zinc coating.

It is *safe* with a load chain that stays in the pocket, regardless of operating position—because of the Wright safety guard.

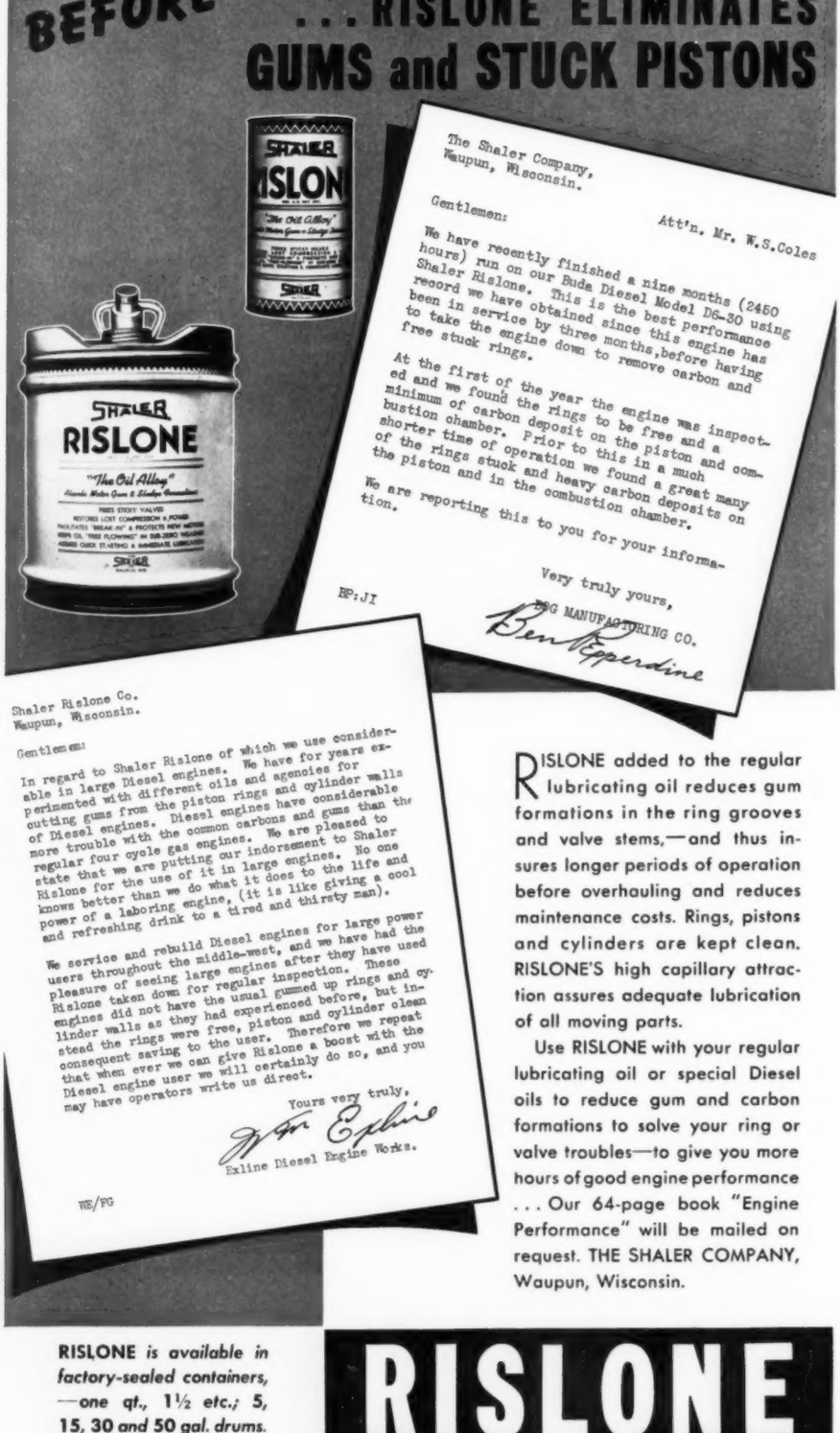
Furthermore, the load chain has a safety factor of 7 to 1, and is made of a special process steel which permits it to elongate (under overload) 3" to the foot before breaking. Likewise the bottom hook will slowly open so that anyone can see the danger when loaded beyond the elastic limit of the chain.

WRIGHT TROLLEYS are as dependable as Wright Hoists—made to give long, faultless service. . . . Write for the WRIGHT CATALOG describing modern hoisting equipment in capacities from ¼ to 50 tons.

WRIGHT MANUFACTURING DIVISION
YORK • PENNSYLVANIA

ACCO

AMERICAN CHAIN & CABLE COMPANY, Inc.
In Business for Your Safety


MORE HOURS
BEFORE ENGINE OVERHAUL
... RISLONE ELIMINATES
GUMS and STUCK PISTONS
SHALER
RISLONE
"The Oil Alloy"
SHALER
The Shaler Company,
Waupun, Wisconsin.
Gentlemen:
Att'n. Mr. W.S.Coles
We have recently finished a nine months (2450 hours) run on our Buda Diesel Model D6-30 using Shaler Rislone. This is the best performance record we have obtained since this engine has been in service by three months, before having to take the engine down to remove carbon and free stuck rings.
At the first of the year the engine was inspected and we found the rings to be free and a minimum of carbon deposit on the piston and combustion chamber. Prior to this in a much shorter time of operation we found a great many of the rings stuck and heavy carbon deposits on the piston and in the combustion chamber.
We are reporting this to you for your information.
Very truly yours,
BP:JI
Shaler Rislone Co.
Waupun, Wisconsin.
Gentlemen:
In regard to Shaler Rislone of which we use considerable in large Diesel engines. We have for years experimented with different oils and agencies for cutting gums from the piston rings and cylinder walls of Diesel engines. Diesel engines have considerable more trouble with the common carbons and gums than the regular four cycle gas engines. We are pleased to state that we are putting our indorsement to Shaler Rislone for the use of it in large engines. No one knows better than we do what it does to the life and power of a laboring engine, (it is like giving a cool and refreshing drink to a tired and thirsty man).
We service and rebuild Diesel engines for large power users throughout the middle-west, and we have had the pleasure of seeing large engines after they have used Rislone taken down for regular inspection. These engines did not have the usual gummed up rings and cylinder walls as they had experienced before, but instead the rings were free, piston and cylinder clean consequent saving to the user. Therefore we repeat that when ever we can give Rislone a boost with the Diesel engine user we will certainly do so, and you may have operators write us direct.
Yours very truly,
Exline Diesel Engine Works.
WE/FG

RISLONE added to the regular lubricating oil reduces gum formations in the ring grooves and valve stems,—and thus insures longer periods of operation before overhauling and reduces maintenance costs. Rings, pistons and cylinders are kept clean. RISLONE'S high capillary attraction assures adequate lubrication of all moving parts.

Use RISLONE with your regular lubricating oil or special Diesel oils to reduce gum and carbon formations to solve your ring or valve troubles—to give you more hours of good engine performance . . . Our 64-page book "Engine Performance" will be mailed on request. THE SHALER COMPANY, Waupun, Wisconsin.

RISLONE *is available in factory-sealed containers, —one qt., 1½ etc.; 5, 15, 30 and 50 gal. drums.*

RISLONE

NATIONAL OIL AND GAS POWER MEETING

THE National Meeting of the Oil and Gas Power Division, A.S.M.E., to be held at Kansas City, June 11 to 14, will feature an engineering quiz. Under the guidance of C. A. C. Rosen, Caterpillar Tractor Co., several experts will attempt to answer questions on Diesel and gas engines, submitted by any one who has a pet problem. Prizes will be awarded to those whose questions confound the experts. These questions should be mailed to Glenn Boyer, Burns & McDonnell Engineering Co., Linwood Blvd., Kansas City, Mo.

At other sessions of this meeting there will be papers on:

(1) Engine Foundations; (2) Automatic Protective Devices; (3) Connecting Rod Bolt Failures; (4) Aviation Diesels; (5) Sewage Gas Engines; (6) Inspection Instruments and Procedure; (7) Diesel Insurance; (8) Chrome Hardening of Liners; (9) Supercharging Diesels (10) Centrifuging of fuel and lubricating oil.

This meeting will be held in the Hotel President where room rates are as follows: Single, $2.50, $3.00, $3.50, $4.00; Double room with double bed, $3.50, $4.00, $4.50, $5.00; Double room with twin beds, $4.50, $5.00, $6.00, $7.00; Suites, one to four persons, $10.00, $12.00, $15.00. All rooms have bath, shower or tub and shower and circulating ice water.

★ ★ ★ ★ ★

THE National Supply Co., Superior Engine Division, has sold a 6 cylinder, 12½" bore, 16½" stroke, 465 hp. at 400 rpm. Diesel engine to the Martinolich Repair Basin, San Francisco, for installation in new tuna clipper to be started immediately. Auxiliary engines are two 125 hp. Superior Diesels direct connected to 75 kw., 3 phase, 240 volt alternators.

REA ANNOUNCES PROGRAM OF POWER RESERVE COOPERATIVES BASED ON DIESEL MOBILE UNITS

RURAL Electrification Administrator Harry Slattery has announced a program of power reserve cooperatives, to insure against prolonged outages on REA-financed distribution lines due to failure of power supplies, and to provide important sources of emergency power as a measure of National Defense. Organization of such power reserve cooperatives is well under way in Georgia, the Carolinas, Illinois, Iowa and Texas. These groups will purchase and

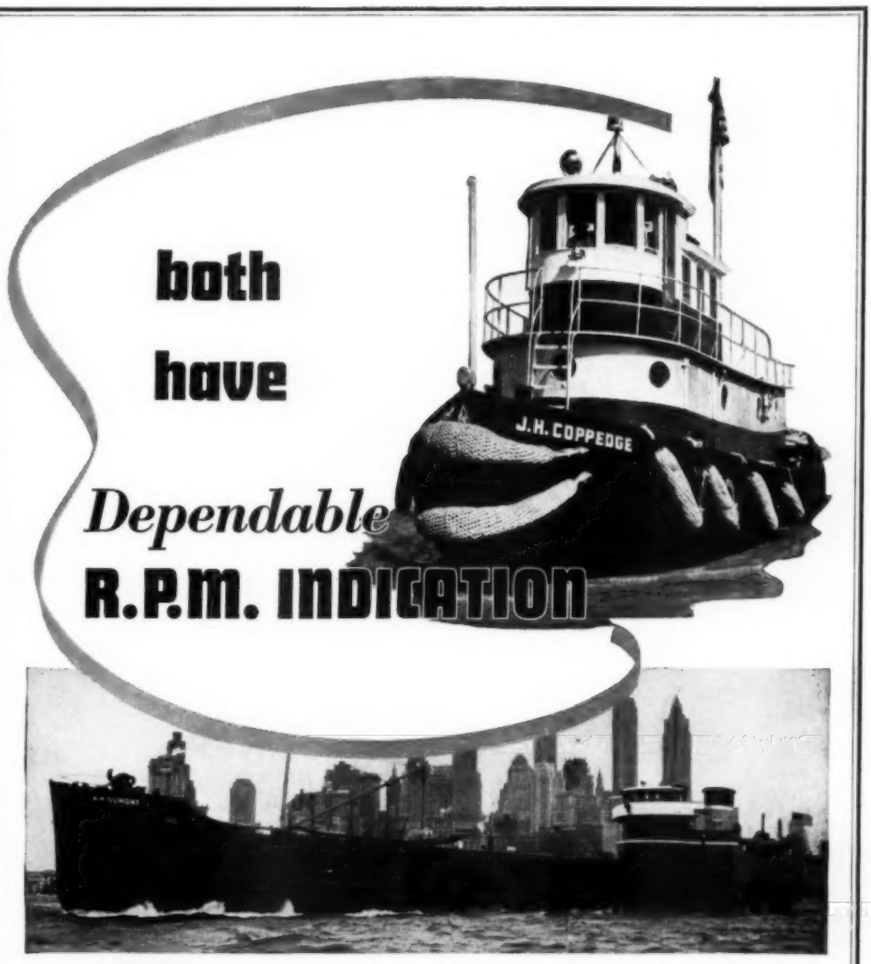
maintain fully mobile Diesel generating plants on a "fire engine" basis, normally storing them in a central convenient location.

Each power reserve cooperative will comprise all of the REA distribution cooperatives within an area. Each member-cooperative will pay annual dues for the upkeep and amortization of the mobile plants. Dues are based on miles of power line in operation, and will pay all costs. In addition, there may be some income from rental of the generators to non-REA agencies for National Defense or for disaster-relief purposes.

The user of a mobile plant will pay all costs of transporting it to where it is needed, operating it, and returning it to its base in first-class operating condition. Member cooperatives will not pay any rental charge; other users will pay a rate tentatively set at $350 a month. The primary purpose of the rural power reserve cooperative is to permit restoration of service on rural power lines in case of storm or other damage to the power source or to the transmission lines which feed a distribution system. As a by-product—which is especially important to the present National Defense efforts—it will provide emergency power for construction work on military establishments, for transplanted or newly-established essential industrial plants pending construction of permanent power facilities, for amelioration of flood, fire, sabotage, or other damage to urban power sources, for emergency communications, for floodlighting temporary airfields and running their machine shops, and for hundreds of other emergency purposes.

The Georgia Power Reserve Cooperative is the only one of the organizations to which REA has already made an allotment. A loan of $36,000 was announced last week to 37 Georgia REA distribution cooperatives, operating about 18,000 miles of rural power lines, which have banded together to buy two complete mobile power plants, mounted on highway trailers so they can be rushed to any part of the State within a few hours.

These mobile units, developed in consultation with REA engineers, are ready for service at all times. They can be connected to a power line and put into operation within an hour after arrival. Each trailer mounts two 50-kilowatt, Diesel-generator sets, all switching equipment, transformers, water and fuel, for 24 hours' operation. The units operate on the trailer, the tires cushioning any vibration. Larger water and fuel supplies can be connected readily. Each trailer costs about $15,000,



...both equipped with
WESTON Electrical TACHOMETERS

Tanker or tug...the modern Diesel craft today is equipped for R.P.M. indications...the modern *electrical* way. For electrical indication not only provides the utmost in dependability, but it also provides quicker, more accurate readings. That's because the electrical pointer follows all speed changes instantly and smoothly, eliminating the confusion caused by jumpy pointers. Easier to install...*far easier* on the maintenance budget...and permitting duplicate and remote indications ...electrical tachometers meet every qualification for efficient Diesel operation. Let us send you all the facts. Write to...Weston Electrical Instrument Corporation, 579 Frelinghuysen Avenue, Newark, New Jersey.

WESTON

ELECTRICAL TACHOMETERS · PANEL AND SWITCH BOARD INSTRUMENTS · MAINTENANCE TEST EQUIPMENT · GAUGE-TYPE THERMOMETERS

FOR OVER 52 YEARS LEADERS IN ELECTRICAL MEASURING INSTRUMENTS

and storage housing, transportation facilities, and service equipment add another $3,000.

When not needed for emergency or rental service, the trailers are stored, each convenient to about half of the State, so that one or both of the generating units can arrive anywhere in the State in no more than five or six hours after a trouble call comes.

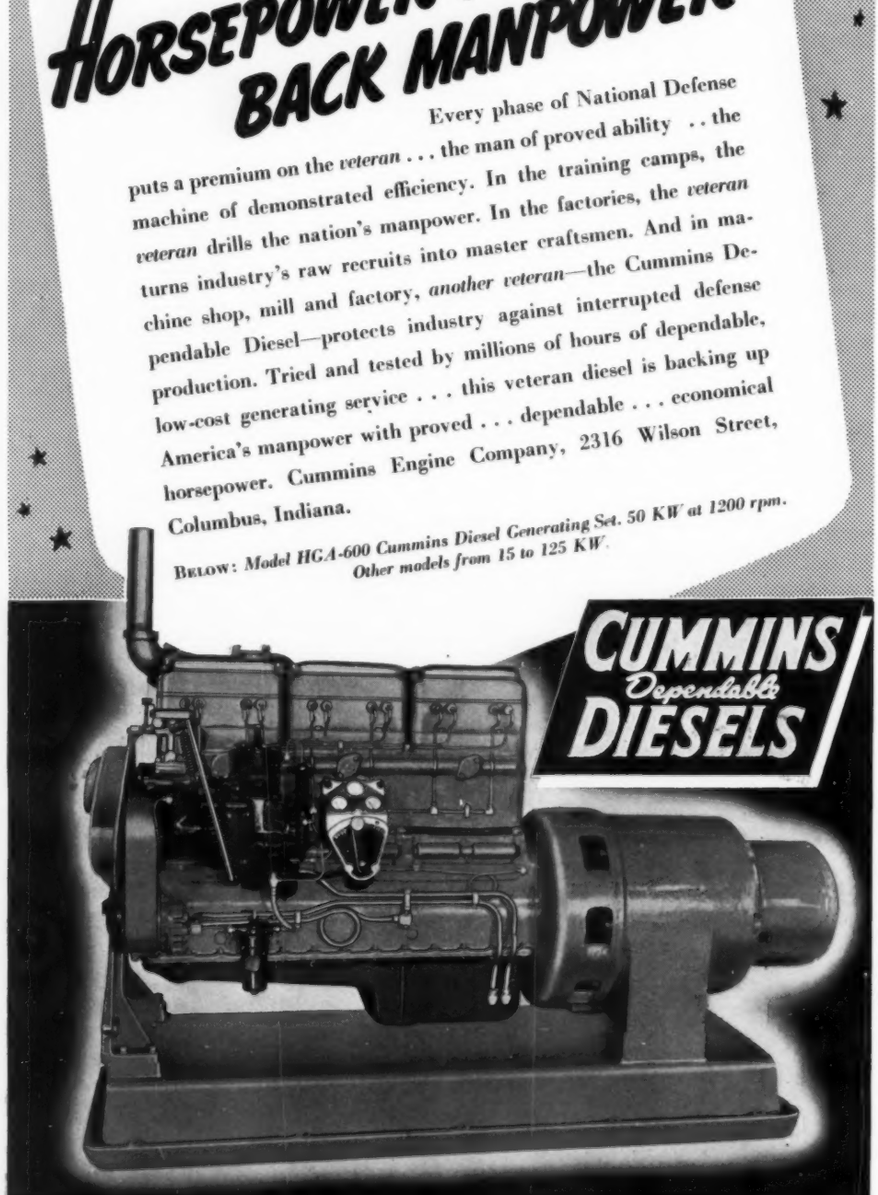
Mobile generators are already in service on REA power systems in Illinois, Virginia, Oregon, New Mexico and North Dakota. Distribution cooperatives in Colorado, Kansas and Ohio have similar equipment on order. All these mobile units—17 in all—were ordered to meet specific, immediate power needs, either because there is no power source close enough to be economically feasible or because the company which controls the available source refuses to sell power at terms in line with those available to most REA systems. All these are temporary installations, pending construction of new permanent generating facilities or negotiation of acceptable terms with existing sources.

The power reserve cooperatives differ in purpose; they are based on the same factors which are responsible for the fire engines scattered over urban areas. REA officials pointed out that it is important to have the best equipment and to keep it ready for instant service, and then to take every possible precaution so that it will be used as infrequently as possible.

HORSEPOWER TO BACK MANPOWER

Every phase of National Defense puts a premium on the *veteran* . . . the man of proved ability . . the machine of demonstrated efficiency. In the training camps, the *veteran* drills the nation's manpower. In the factories, the *veteran* turns industry's raw recruits into master craftsmen. And in machine shop, mill and factory, *another veteran*—the Cummins Dependable Diesel—protects industry against interrupted defense production. Tried and tested by millions of hours of dependable, low-cost generating service . . . this veteran diesel is backing up America's manpower with proved . . . dependable . . . economical horsepower. Cummins Engine Company, 2316 Wilson Street, Columbus, Indiana.

BELOW: *Model HGA-600 Cummins Diesel Generating Set. 50 KW at 1200 rpm. Other models from 15 to 125 KW.*



SANTA FE ORDERS

PURCHASE by the Santa Fe Railway of another 5400 hp. Diesel-electric freight locomotive has been announced by President Edward J. Engel of that company.

The order for the 5400 hp. Diesel-electric freight locomotive, similar to four ordered previously, two of which are now in trans-continental freight service, was placed with Electro-Motive Corporation, LaGrange, Illinois.

DR. TRACY C. JARRETT TO KOPPERS

DR. Tracy C. Jarrett, formerly assistant metallurgist with the American Optical Company, has been appointed chief metallurgist for Koppers Company, American Hammered Piston Ring Division, Baltimore, Md. He has just moved from his home in Southbridge, Mass., to Baltimore where he took over his new duties on Feb. 10.

Dr. Jarrett received his Bachelor of Science degree in metallurgy from South Dakota School of Mines in 1932; his Master of Science degree from Harvard Engineering School in 1933; and

his degree as Doctor of Science in Metallurgy from Harvard in 1936. During 1931 and 1932 he was a laboratory instructor in metallurgy at the South Dakota School of Mines. He also

was an instructor in metallurgy at Harvard as assistant to the late Prof. Albert Sauveur.

He is a member of the American Society of Metals and of the American Institute for Mining and Metallurgical Engineers. He is the author and co-author of a number of technical articles and is the inventor of the Jarrett Metallurgical Polishing and Lapping machine.

SIBLEY AGENCY MOVES

THE Marine Advertising Agency of Otis A. Sibley has moved to new quarters at 140 Cedar Street and the new telephone number is BEekman—3-4713. Mr. Kenneth A. Westervelt is joining this organization as of May 1, 1941, and brings with him a background of technical education and practical advertising experience.

★ ★ ★ ★ ★

THE Navy Department has awarded contracts to the Cleveland Diesel Engine Division of the General Motors Corporation to furnish propelling machinery and auxiliary machinery as follows:

Propelling machinery for submarine chasers, 18 sets at $450,000 per set—$7,650,000.

Diesel engine driven generators for minesweepers, 158 sets at $78,000—$12,324,000.

Propelling machinery for motor minesweepers, 70 sets at $126,300 each—8,841,000.

Propelling machinery for minesweepers, 20 sets at $605,000 per set—$12,100,000.

DIESEL STANDBY POWER BULLETIN

HOW the problem of low-cost, dependable standby power has been solved by the medium-speed, heavy-duty Diesel engine, is told in a pamphlet printed by Caterpillar Tractor Co. Pointing out that to provide complete protection against interruption of service due to main power failure, standby power must be capable of meeting any emergency. Caterpillar lists and photographs a wide variety of actual, successful installations.

Standby power must be able to go into service immediately and operates for minutes, hours, or days at a time, if the emergency requires it, the booklet says. "It should have the same assurance of continuity as if the service were continuous."

The booklet, Form No. 6537, can be obtained from Caterpillar Tractor Co., Peoria, Illinois.

FAIRBANKS, Morse & Co., through its Los Angeles office, completed the sale of another Diesel engine to the Santa Catalina Island Co. Light and Power Department. The new engine is a five cylinder, 575 hp. Diesel, direct connected to a 490 kva., 392 kw., 3 phase, 60 cycle, 2400 volt alternator, and exciter.

When installed, this will make six Fairbanks-Morse Diesels on this famous island. The others are: Two units of 720 hp. each, two of 360 hp. each., and one of 525 hp.

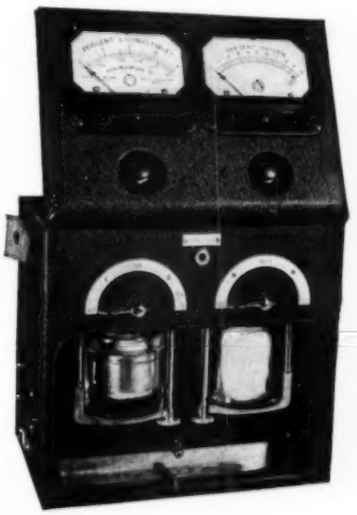
LARGE DIESEL YACHT GOES TO THE NAVY

THE 218 ft. Winton Diesel-engined yacht "Haida," built by the Krupp Works, Germany, in 1930. for Colonel Max Fleischmann of Santa Barbara, California, has been sold to the U. S. Navy and converted into an auxiliary patrol vessel.

The 1,000 ton ship has a cruising radius of 8,000 miles, a speed of 18 knots, and cost $500,000 to build. She was formerly berthed at San Pedro, California.

Users of

CITIES SERVICE LUBRICANTS get an EXTRA ADVANTAGE!



Heat-Prover Service is now available to users of Cities Service Industrial Fuels and Lubricants. This is an economy measuring service which you can secure in addition to the quality and economy advantages offered by Cities Service's SERVICE PROVED Fuel and Diesel Oils.

The Heat-Prover is an ingenious device—a by-product of our research in metallurgy. It registers continuously and instantaneously changes in the amount of oxygen and combustibles in furnace gases. It is an excellent guide in adjusting 4-cycle Diesels and for combustion control in heat generating plants. In the heat treatment of metals, it is invaluable. It assures uniformity and reduces scrap losses.

Let us tell you how you can secure the use of one of these machines. Mail the coupon today.

CITIES SERVICE DIESEL LUBRICANTS

FREE JUST CLIP AND MAIL

CITIES SERVICE OIL COMPANY
ROOM 1326, SIXTY WALL TOWER, NEW YORK

Please tell me how I can get Heat-Prover Service in my shop. D. P.

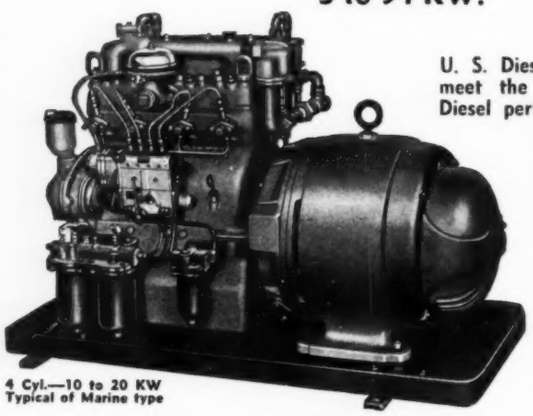
Name .....

Name of Shop .....

Address .....

City ..... State .....

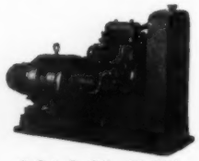
"U.S." DIESEL
ELECTRIC PLANTS
3 to 94 KW.



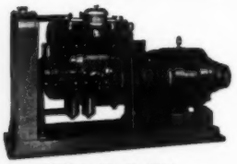
4 Cyl.—10 to 20 KW
Typical of Marine type

U. S. Diesel Electric Plants are built to meet the highest standards of modern Diesel performance. Safety . . . smooth running . . . easy starting . . . and economical operation — are the *plus values* which you get in a U. S. Diesel Electric Plant. One, two, four and six cylinder models. 3 to 94 KW. Complete lines for both marine and land service. Write for full information.

U. S. MOTORS CORP.
542 Nebraska St.
Oshkosh, Wis.



2 Cyl. 5, 7½, 10 KW.



6 Cyl. 25-60 KW.

94 KW.

Specify
Quincy
COMPRESSORS
DEPENDABLE STARTING AIR
assured by these quality features
1. Timken Roller Bearings
2. Semi-Steel Pistons
3. Balanced Crankshafts
4. Cushioned Steel Valves
5. Lynite Rods
6. Constant Level Oiling
7. Improved Cooling
8. Nickel Chrome Castings
Hundreds of Diesel installations throughout the country have proved the dependability of Quincy Compressors for starting service. Many leading Diesel manufacturers furnish Quincys as standard equipment. There is a Quincy Compressor ideally suited to every Starting Service requiring intermittent pressures up to 500 lbs. per sq. inch. Models available with either gas engine or electric drive or a combination of both. Remember! Specify Quincy for dependable Diesel Starting Service!
QUINCY COMPRESSOR CO.
451 Main St., Quincy, Ill.
New York • Chicago • BRANCH OFFICES: San Francisco • Cleveland • St. Louis
GET NEW FREE BOOK
Contains Complete Information on Quincy Compressors for Diesel Starting Service.

MORE DIESEL-ELECTRIC BUSES FOR STEINWAY OMNIBUS CORPORATION

STEINWAY Omnibus Corporation of New York City, operating along Steinway Street in the Borough of Queens, is adding five more Diesel-electric buses to its fleet, increasing the quantity in operation to thirty-five. The first twenty buses were put in service in November, 1939; within two months five more were required, and last September five were added. As in the case of the previous ones, the new buses will be built by the Twin Coach Company and powered with Model TC-529 Hercules Diesels with General Electric GT-1501 generators and GE-1205 motors. The new buses will be equipped with electric service braking.

★ ★ ★ ★ ★

SAN Diego's new bay ferry to the U. S. Naval Air Station on North Island, built by the San Diego Marine Construction Co., for the Star and Crescent Boat Co., is powered with twin 125 hp., 6 cylinder, Cummins Diesels with Twin-Disc 3-to-1 reduction gears. As is customary with this company's boats, the engines are fresh-water cooled.

★ ★ ★ ★ ★

ASHLAND Oil & Refining Company of Ashland, Kentucky, has awarded a contract to the Calumet Shipyard & Dry Dock Company of Chicago for the construction of another Diesel tugboat, a duplicate of hull 123 now building at this yard. The dimensions are 140 ft. x 31 ft. x 9 ft., with a 375 gross.

DIESEL TRACTOR TRAILER HAULS 80,000 POUND PAY LOAD

WITH a total gross weight of approximately 120,000 pounds, the Walter Tractor Trailer shown above carries regularly twice as much pay load as its own weight. Three of these tractor trailer combinations are now in service with the Interstate Iron Company at Buhl, Minnesota.

Of all the motorized equipment hauling ore on the Iron Range in Minnesota, these Walter units are reported to have the largest ton-per-haul capacity. Powered with Hercules Diesel

engine Model DFXD, 5½" x 6", these tractors start at the bottom of the ore pit and climb varying grades up to 10% on a total haul of one and one-half miles.

★ ★ ★ ★ ★

THE Worthington Pump and Machinery Corporation, Los Angeles Division, has been awarded a contract by the United States Government for three, five cylinder Diesels driving G-E generators for installation at the Cholas Heights Radio Station, 11th Naval District, San Diego; San Clemente Naval Station; and Wendover Bombing Range, 125 miles north of Ogden, Utah, one Diesel generating unit in each location respectively.

SOMERVILLE ELECTED ATLAS VICE-PRESIDENT

G. N. Somerville, rounding out his 25th year in the design and sale of internal combustion engines, has been elected Vice-President of the Atlas Imperial Diesel Engine Company of Oakland, California.

Mr. Somerville brings to his new position a seasoned background of experience, having progressed from the drawing board to chief engineer. In his long association with the Atlas Company, he has held the positions of Export Manager, General Sales Manager, and has served on the company's Board of Directors.

His headquarters will remain in the executive offices of the company in Oakland and his responsibilities will extend into general supervision of all activities of the Oakland factory.

★ ★ ★ ★ ★

FAIRBANKS, Morse & Company has been awarded the Navy Department contract for the construction of propelling machinery for eleven submarine chasers of the PC542-577 class. The Beloit, Wisconsin, plant will build these engines which will cost $415,000 each, for a sum of $4,565,000.

★ ★ ★ ★ ★

THE San Francisco Towing Company has awarded a contract to the Pacific Coast Engineering Company, Oakland, California, for the construction of a Diesel towboat, to be 75 gross ton, 64 ft. in length, 16 ft. beam, and 10 ft. deep.

ENGINE DETAIL BOOKLET BY CATERPILLAR

A 24-PAGE booklet entitled "More For Your Money" has just been released by Caterpillar Tractor Company, Peoria, Illinois.

It contains action photographs of tractors and road machines on various types of operations. Separate sections of the book are devoted to the fuel system, general engine construction features, the lubricating system, "Hi-Electro" hardening for parts subject to wear, operator comfort, and pictured models and types of products manufactured by the Company. This booklet may be obtained by requesting Form 6635 direct from Caterpillar Tractor Co.

FLUID DRIVE SUCCESS IN COPPER REFINERY

Traction Type American Blower Fluid Drive Smooths Performance, Eliminates Stalling of Diesel in Rod Mill Installation

Running true to form, Fluid Drive is winning new friends every day in the copper refinery where it transmits torque from a 300 h.p., 514 r.p.m. Diesel to a large rod mill.

Among the many practical advantages of the Fluid Drive (Hydraulic Coupling) which won the approval of operating men are these—

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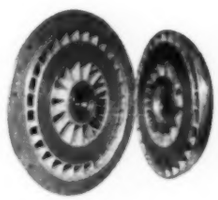
The Fluid Drive prevents stalling of the engine and protects it completely from any damage in case the rod mill becomes jammed. Sudden overloads are absorbed by slippage within the Fluid Drive.

All torsional vibrations and shocks which would normally be transmitted through the shaft are absorbed by the Fluid Drive.

A No. 48 Traction Type American Blower Fluid Drive is used in this successful rod mill installation.



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Have you investigated American Blower Fluid Drives (Hydraulic Couplings) for your plant or product? You're overlooking a real bet if you don't consider their many advantages for your own problems of torque transmission and speed control from either electric motors or internal combustion engines. Phone or write the nearest American Blower branch office now for complete data.

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THE Bureau of Supplies & Accounts, Navy Department, Washington, D. C., has received bids for the construction of one or more all-welded, steel hull, twin-screw Diesel-propelled package freight barges to carry about 650 tons. This ship will be 183 ft. in length, with a 40 ft. beam, and 10 ft. deep, and will have a speed of about ten knots.

PERFEX INCREASES RADIATOR PRODUCTION FACILITIES

PERFEX Corporation, Milwaukee, Wisconsin, manufacturers of industrial radiators, has enlarged its radiator manufacturing space by a new addition to its factory, according to H. E. Lindemann, vice president in charge of production. The new building, completely modern in lighting, layout and equipment, adds approximately 30,000 square feet of floor space for the manufacture and assembly of industrial radiators, unit heaters and heat exchangers. The accompanying illustration shows the new addition.

THE Motorship "American Press" was launched on March 11 at the Western Pipe and Steel Company's plant at South San Francisco. This vessel is 417 ft. 9 in. overall length with a shaft horsepower of 4,000 and a speed of fifteen knots fully loaded. The "American Press" is a sister ship of the C-1 cargo ships "American Leader," "American Manufacturer," "American Builder," and a fifth ship not yet named.

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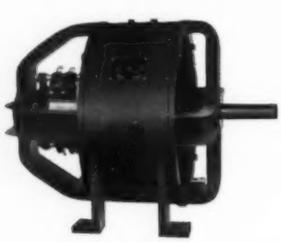


Latest Diesel Patents

A description of the outstanding patented inventions on Diesel and Diesel accessories as they are granted by the United States Patent Office. This information will be found a handy reference for inventors, engineers, designers and production men in establishing the dates of record, as well as describing the important Diesel inventions.

Conducted by C. CALVERT HINES*

2,192,442

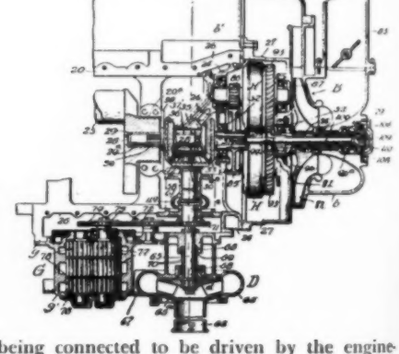
INTERNAL COMBUSTION ENGINE

Samuel K. Hoffman, Williamsport, Pa., assignor, by mesne assignments, to Aviation Manufacturing Corporation, Chicago, Ill., a corporation of Delaware

Application November 5, 1934, Serial No. 751,491

2 Claims. (Cl. 123—195)

1. In an auxiliary assembly adapted for use with an engine, the combination of a unidirectional rotary device for forcing a fluid to the engine, a shaft adapted to be connected to and driven by the engine, an automatically-acting one-way clutch comprising a clutch-spring and a pair of coaxial shafts into both of which the spring is extended, one of said hollow shafts



being connected to be driven by the engine-driven shaft and the other of which is connected to drive the device, a transversely extending shaft, gears between the transversely extending shaft and the hollow shaft connected to drive the device, and means for coupling an auxiliary motor to the outer end of the transversely extending shaft.

2,195,044

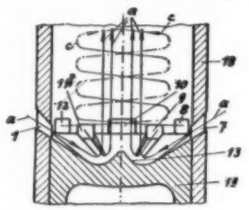
TWO-STROKE INTERNAL COMBUSTION ENGINE AND METHOD FOR OPERATING THE SAME

Franz Zahren, Brunswick, Germany, assignor to the firm Bussing-Nag Vereinigte Nutzkraftwagen Aktiengesellschaft, Brunswick, Germany

Application December 17, 1937, Serial No. 180,316

In Germany December 19, 1936

12 Claims. (Cl. 123—65)



11. An internal combustion high-speed two-stroke engine comprising a cylinder provided

* Patent Attorney, 811 E Street, N.W., Washington, D. C.

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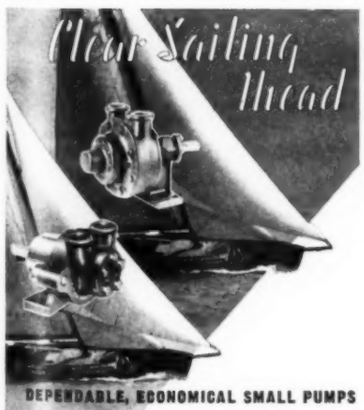

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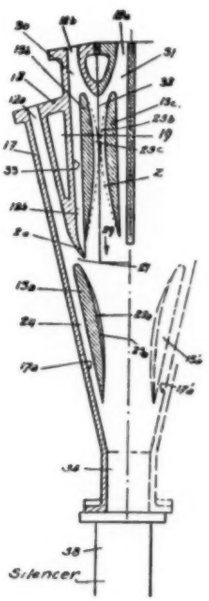
with a ring of tangential and radial inlet ports distributed over the wall of the cylinder and a hollow piston having a combustion chamber in the face thereof, in which the upper and lower faces of at least one port are substantially parallel to one another and in which the upper and lower faces of at least one of the ports form different angles with the longitudinal central axis of the cylinder and at least one inlet port compared with the great part of the inlet ports is off-set as to height relative to the outer dead point of the piston and these ports are directed towards the combustion chamber provided in the face of the piston in such a manner that the waste gases are removed by the gaseous medium entering through said ports, the greater part of the ports being arranged eccentrically and the off-set inlet ports being arranged centrally relative to the longitudinal central axis of the cylinder.

2,187,342
EXHAUST OF GASES FROM ENGINES
Henri Coanda, Clichy, France
Original application July 17, 1936, Serial No. 91,062. Divided and this application July 14, 1937, Serial No. 153,500. In France July 17, 1935

8 Claims. (Cl. 60—32)



1. An exhaust device for a fluid flowing at high lower pressure, which comprises, in combinavelocity and under pressure into a medium at tion, a vessel opening into said medium, at least one flat tube opening into said vessel, and a slotted structure carried by said vessel opposite the outlet of said tube into said vessel, said structure consisting of a plurality of wing-like elements arranged adjacent and parallel to one another with their leading edges turned toward the direction from which the fluid is flowing, these elements being positioned close to one another, so as to leave slot-like passages between them, and in stepped relation, so that the upper side of each extends beyond the trailing edge of the element located above it and forms an outwardly curved prolonged lip to the slot existing between these two last mentioned wing-like elements, whereby the flow of fluid through each of these slots produces a suction acting on the stream flowing through the next slot above it and facilitates the flow structure.

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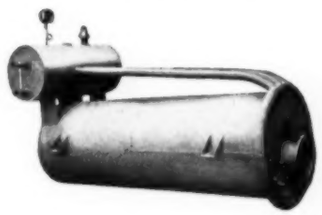

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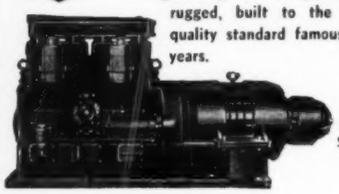

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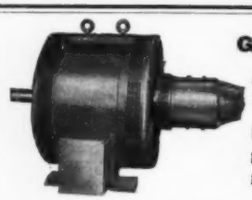

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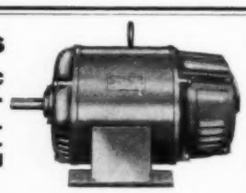
For all applications Stationary and Marine



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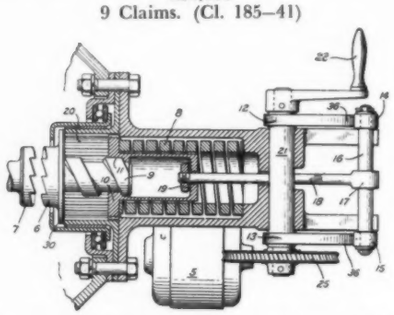
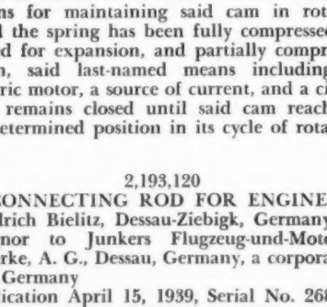
STAR ELECTRIC MOTOR CO. BLOOMFIELD, NEW JERSEY

2,187,545
ENGINE STARTING MECHANISM
Raymond P. Lansing, Montclair, N. J., assignor to Bendix Aviation Corporation, South Bend, Ind., a corporation of Delaware
Application January 12, 1939, Serial No. 250,655
9 Claims. (Cl. 185—41)



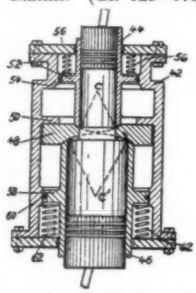
1. The combination with an engine-engaging member, a helically wound spring, and a driving connection therebetween, of means for compressing said spring, said means including a rotatable cam operating upon said spring in such manner that the expansion of the spring, for delivery of starting energy to the engine-engaging member follows immediately upon completion of the compression thereof, and prior to cessation of rotation of the cam, and means for maintaining said cam in rotation until the spring has been fully compressed, released for expansion, and partially compressed again, said last-named means including an electric motor, a source of current, and a circuit that remains closed until said cam reaches a predetermined position in its cycle of rotation.

2,193,120
CONNECTING ROD FOR ENGINES
Friedrich Bielitz, Dessau-Ziebigk, Germany, assignor to Junkers Flugzeug-und-Motorenwerke, A. G., Dessau, Germany, a corporation of Germany
Application April 15, 1939, Serial No. 268,054
In Germany April 14, 1938
3 Claims. (Cl. 74—596)



1. In an internal combustion engine having a plurality of rows of cylinders, pistons in said cylinders, a common crankshaft, and two kinds of connecting rods joining pairs of pistons, each of which lies in a different row, to the same bearing upon said shaft, and producing different mass forces, respectively, thereon, the improvement comprising disposing both kinds of said rods in irregular sequence on each side of said crankshaft whereby the geometrical sum of the amplitudes of the rotary oscillation impulses produced by the different mass forces is minimized.

2,203,885
LINER FOR INTERNAL COMBUSTION ENGINES
Karl Wilcken and Franz Kliempt, Dessau, Walter Fritz, Dessau-Ziebigk, and Wilhelm Heck, Dessau, Germany, assignors to Junkers Flugzeug-und-Motorenwerke, Aktiengesellschaft, a corporation of Germany
Application April 15, 1939, Serial No. 268,102
In Germany April 16, 1938
8 Claims. (Cl. 123—173)



1. In an internal combustion engine having a cooling jacket, two cylinder liners of different size coaxially aligned and mounted for longitudinal movement within said jacket, an intermediate member mounted for longitudinal movement within said jacket and interposed and providing communication between said liners, and resilient means for holding said liners into engagement with said member.

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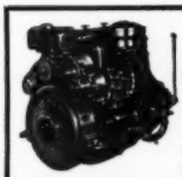

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"MODERNIZING YOUR DIESEL"

FAIRBANKS-MORSE Diesel engines which have been in service for many years were so designed that they can now be modernized by the use of certain change-over parts. Many of these engines which have been in operation from five to ten years and, in some cases, longer are now being brought up-to-date by rebuilding them with new parts such as cylinder heads, cylinders, pistons, connecting rods, needle bearing piston pins, and so on. The result, generally, is to bring new life to the wearing parts of the engines as well as to achieve more power, greater economy, and better over-all efficiency. A new bulletin titled "Modernizing Your Diesel," just issued by Fairbanks, Morse & Co., explains in detail with ample text and illustrations both how modernization of Diesels is accomplished and the results that may be expected. This will prove a boon to engine owners and operators whose Diesels have been rendered obsolete by recent advances in design. An interesting case of how this modernization plan kept a plant in operation until additional new Diesels could be acquired was reported in the Deer Island Granite article in the March, 1941, issue of DIESEL PROGRESS.

of valves used to control the flow of hot water. sibilities utilization of waste heat affords.

ENTERPRISE ACTIVITIES

THE Netherland Indies government has ordered twenty-nine Enterprise marine Diesel engines, it was announced by Charles G. Cox, vice president and sales manager of the Enterprise Engine & Foundry Company. Totaling 18,680 hp., the engines will include:

Ten Type DMG-6 400 hp. for mine sweepers.
Two Type DMG-6 400 hp. for small hopper dredge
One Type DML-6 180 hp. for coastal survey boat
Two Type DMG-6 750 hp. for government transport and inspection boat
Six Type DSX-6 300 hp. generating sets for large mine sweeper auxiliaries
Two Type DMG-36 1000 hp. for sea-going hopper dredge
Six Type DMG-38 1400 hp. for patrol vessels.

"This is the first major machinery contract placed in the United States for Diesel engine equipment by the Netherland Indies government. Hitherto all such orders were placed in Europe," Cox said.

He also announced that the Foss Launch and Tug Co. in Tacoma has purchased a Type DMQ-6 750 hp., a DMG-8 500 hp. and a DMG-6 300 hp. Enterprise Diesels for installation in new vessels and replacements in existing boats.

It was further reported that trials were completed this week on the installation of a new Type DMG-6 300 hp. Enterprise Diesel in the tug, "Equator," of the Puget Sound Tug & Barge Co., Seattle. Installations and trials have also been completed on a new type DMW-6 240 hp. Enterprise Diesel in the tug, "Marion," of the San Francisco Towing Co., and the vessel has been put into regular service for gasoline barge towing between Sacramento and San Francisco.

SUPERVISING & OPERATING ENGINEERS' SECTION

. . . . *Continued from page 49* . . . .

instance the exhaust has a water jacket installed around it. A small portion of the discharge water is taken from the circulating pump before it passes through the heat exchanger, is forced through the water jacket and into coils in the service tank, thus preheating the fuel just before it is pumped into the engine. This water then passes back into the circulating system. The amount of water passing through these coils can be either manually or thermostatically controlled, depending upon the type of valves used in controlling the flow of hot

In plants where Diesels are used as peak load equipment, operating in conjunction with steam plants, the exhaust from the Diesels is often used in conjunction with waste heat boilers to maintain a heat balance. Several such plants are now in operation and considerably over half the BTU content is reclaimed.

Space does not permit of further discussion of the many uses to which the waste heat can be applied. Engineers, however, faced with heating problems or desirous of obtaining better overall efficiencies where they are not utilizing the waste heat, as well as prospective buyers of Diesel equipment, should investigate the possibilities which the utilization of waste heat affords.

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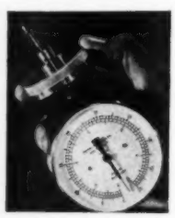

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